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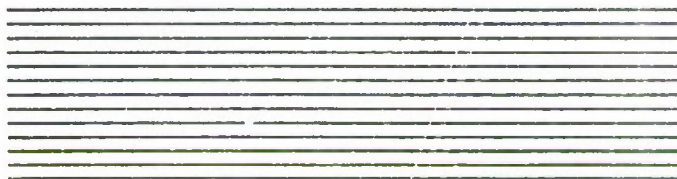
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TRANSMISSION OF PROCUREMENT TECHNICAL REQUIREMENTS IN THE COMPETITIVE REPROCUREMENT OF MILITARY DESIGN EQUIPMENT



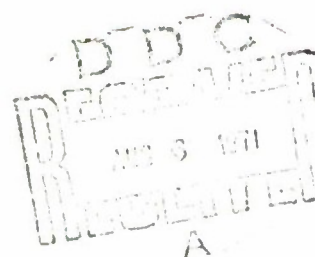
JUNE 1971

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PREFACE

The basic purpose of PRO Project 70-5 was to conduct research into a procurement problem area as identified by the title. This printed version (005-1) of the results of that research is intended to provide a comprehensive documentation of the techniques employed, underlying rationale, findings, analyses, conclusions and recommendations derived during the effort. A follow-on digest version (005-2) is planned which will present the main ideas in a more direct and concise manner. Either version may be of value to procurement managers depending upon an individual's depth of interest.

ABSTRACT

The success of fixed price competitive reprocurments of Military Design Equipment is affected by the manner in which procurement technical requirements are transmitted between Government and Industry. The technical data package is the communication vehicle. But inherently it is complex and unique; both Government and Industry specialists are often not able to completely understand the content and the objectives defined therein.

This study seeks to identify the characteristics of this problem, its salient causes, and potential solution areas. Its arguments center around the issues of the acquisition of adequate technical data and its effective utilization in a procurement.

its approach deals with the development of management concepts for individuals making decisions involving procurement.

ACKNOWLEDGMENTS

The US Army Procurement Research Office would like to express its thanks to the procurement, engineering, and product assurance personnel from the commodity commands and project-managed organizations who were so helpful in gathering the data for this report. We would in particular give thanks to the PROMAP 70 Action Officers whose tireless efforts were singularly important.

Other agencies from whom there were contributing personnel to this report included: Departments of Defense, Air Force, Navy, Army, General Accounting Office, DCAS, Rand Corporation, George Washington University, and various defense contractors. Although they are too numerous to list here, we extend our sincere appreciation to all these individuals. The views expressed in this report, of course, are not necessarily those of the above individuals or their organizations.

SUMMARY

1. Problem. In defense procurement the policy of seeking maximum practicable competition has resulted in substantial savings. The competitive potential of Military Design Equipment has been constrained, however, by legal, economic, and technological transfer difficulties. While the legal and economic barriers can be made tolerable, the technological transfer barrier has resisted many attempts for solution and remains a constant nemesis to the communication of requirements to a new producer. Consequently, a first competitive reprocurement often experiences unplanned and undesirable modifications during production that adversely affect the cost, schedule, and technical parameters of the contract and thereby tend to defeat the objectives of the procurement.

2. Background. Traditionally, the Government has had difficulty transferring the technology acquired during the development and early production phase of an item to a competitive production phase. Recent emphasis on improving and refining the materiel acquisition process has prompted AMC to look more closely into the areas of technical data and early competitive production contracts.

3. Objectives. The objectives of this study are to identify:

- a. The nature and general aspects of the problem;
- b. The characteristics of events in problematical procurements;
- c. The characteristics of techniques employed to avoid or remedy the problem;

- d. The causal patterns tending to create the problem; and,
- e. Potential solutions.

4. Scope and Methods. Consistent with the study's goal of identification, the research plan called for primary data. A field study inquiring into actual current individual procurement actions was performed to render the basis for empirical analysis of the problem. This data was gathered from the contract files of various AMC commands and interviews with pertinent AMC personnel. The procurement actions were reviewed for: contract changes, confrontations between Government and contractor, underlying obstacles, procurement devices used, objectives attained, validity of source selection, and other relevant data. The data was derived from FY 70 FFP production contracts that were early shifts to competition. The items and parts studied were of various levels, complexity, and dollar value. The analysis of this data was the basis for the findings and conclusions of this report.

Basic delimitations: (a) This is not a case study or intense review of individual buys; (b) Not all of the commands were studied; and (3) the emphasis was on relevant procurement techniques rather than the engineering aspects of the problem.

5. Findings and Conclusions.

a. The success of competitive reprocurments of Military Design Equipment is significantly influenced by the manner in which the procurement technical requirements are transmitted to the competitive market place.

b. To successfully accomplish objectives, individual specialists need an opportunity for clarification of the TDP due to its complexity and uniqueness.

c. Under present day conditions the TDP clarification process results in unplanned and undesirable contract modifications. The technical objectives of the procurement are easily misunderstood and are often not clearly defined.

d. The PCO and the contractor will more readily accomplish the technical objectives when they assume their share of responsibility for the adequacy of the documentation.

e. A "proceduralized" avenue of communication should be and can be devised to permit clarification of the TDP. "Proceduralized" clarification would enhance definition and understanding and permit concentration on the technical objectives, both primary and secondary.

f. A technical objectivity review (TOR) should be established to facilitate Government coordination and functional processing throughout solicitation, award, and contract administration.

g. Special standards of responsibility (SSR) should be emphasized to facilitate more meaningful selection of contractors.

h. The preproduction evaluation (PPE) concept should be emphasized to facilitate selection of contractors and performance by contractors.

i. This study develops the above concept. It eventually should permit "proceduralized" technical clarification without unplanned and undesirable contract modifications; it should permit a more fully effective transmission of procurement technical requirements.

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CHAPTER I - INTRODUCTION

INTRODUCTORY DISCUSSION

General Policy

The policy of the Government is to obtain the maximum practicable competition in procurement programs in order to promote efficiency and economy in both Government and Industry. Competition has broad social merits and is also generally believed to yield lower prices to the purchaser. In defense procurement, this policy has historically resulted in substantial savings. Evidence of this fact is readily available by inquiry into several or many procurement actions in process at any given time.

General Problem

The economic savings attributable to any single procurement action, however, is relative to the particular class of hardware to be evaluated and to the degree of difficulty in attaining competition for that given item. Supplies that are commercially available, either off-the-shelf or with minor modification, tend to have a high competitive potential. Supplies that must be designed peculiarly for the military tend to have a much lower competitive potential.

Many reasons have been cited to describe the reduced competitive potential of Military Design Equipment (MDE) and weapons systems encompassing two or more such items of equipment. Such reasons can usually be categorized into three general types of difficulty: legal difficulties relating to the source of R&D funding (private or Government) and to the respective rights of the parties; economic difficulties relating to the

start up cost; and, technological transfer difficulties relating to the task of communicating design and production technology to firms that were not engaged in the original R&D or previous production efforts.

The legal barrier is tolerable because it is equitable. It can be reduced by various techniques of substitution, circumvention, outright purchases of the rights to the data and use of performance specifications, (form, fit and function) rather than configuration design specifications. It is a relatively acceptable barrier, even though it limits competition. It elicits conformance rather than attack because it is recognized and controlled by the principles, policies and laws relating to patents and limitations upon rights in data. Such rights tend to flow to the party that funds the conception and development of the technical information.¹ Theoretically, both Government and Industry benefit from the protection of patents and rights in data.

The economic barrier is tolerable only when it is clearly infeasible or not cost effective to strive for competition. It is therefore, constantly undergoing attack in various ways: by "breaking out" components for direct or competitive purchases; by using the techniques of multi-year procurement; by performing advance production engineering efforts to enhance competitive potentials; by emphasizing competitive alternatives and thereby planning for down-stream competition early in the materiel life cycle.

The technological barrier, however, is scarcely tolerable at all. It is merely a matter of communication--of transferring information

¹ASPR 9-201, 9-202 and 9-203

legally owned and determined to be cost effective for transfer from one source to another. In this connection, the Government has evolved the policy to acquire the developer's technical data, which was conceived and developed by public funds, and then furnish it to the market place of prospective suppliers to solicit competition for items identical in design to that of the developer or previous producer. The Government usually acquires such technical data at the time it decides to reprocur the equipment. It attempts to acquire only the type and quantity of data that is necessary in view of its intended use.

Several recent improvements in data acquisition have recently been effected and are currently undergoing implementation. Pursuing the policy to acquire and transmit identical design data has been a struggle. It must be "adequate", once acquired, for the competitive reprocurment purpose intended or else much of the benefit of competition is diluted.

Some observers suggest that the task of acquiring adequate data is overly great--too great, in fact, to reasonably expect substantial improvements in competitive potentials. On the other hand, some practitioners in the business of acquiring technical data hold that the Government has already achieved significant successes in the process of acquiring adequate technical data and continues to do so on a rather routine basis. Much, if not most, of the problems that are subsequently experienced after the competitive award of early reprocurments, it is alleged, are due to the difficulties in transmitting the otherwise adequate technical data. It is the purpose of this study to examine the latter contention. This is a study of the transmission of procurement technical requirements.

STATEMENT OF THE PROBLEM

The general aspects of the problem have been described above--i.e., Military Design Equipment tends to have a lower competitive potential than is desirable.

The overt characteristics of the problem are observed as follows: After the RDT&E and initial production phases of the life cycle, the first competitive reprocurement tends to experience unplanned and undesirable events during production. The consequences of these events adversely affect the cost, schedule and technical parameters of the contract and frequently require numerous unplanned and undesirable modifications or restructuring. This adversity, in turn, affects the various participating Government managers in their planning and control of the procurement process. In effect, the "first competitive buy" is characterized by a loss of control. It jeopardizes:

1. The mission objectives;
2. the economies achievable through competition;
3. the assurances and benefits of a broad industrial base as alternate and additional sources of supply;
4. the validity of competitive source selection criteria;
5. the feasibility of risking competition in vital reprocurement actions.

The incidence and severity of unplanned and undesirable contract modifications is distinctly less acute when requirements are placed with the developer or previous source of supply. This suggests the hypothetical issues pursued by this report. This report is an effort to further identify

and analyze the covert nature characteristics and causes of unplanned and undesirable contract modifications.

OBJECTIVES

For many years the process of specifying technical requirements has been imperfect. It is a general problem common to many elements of the Department of Defense. Any manager striving to improve a process often finds it difficult to distinguish between fundamental causes and symptoms. Since symptoms are often discretely "painful", they tend to compel expedient treatment. Devices are often created to work around the difficulties and the fundamental causes remain.

The motivation of this study is a normal management desire to locate and isolate fundamental causes of the problem in transmitting procurement technical requirements. The goal is to suggest fundamental improvements.

The specific objectives of the study, therefore, are to:

1. Identify the nature and general aspects of the problems in transmitting procurement technical requirements.
2. Identify the characteristics of the various events and confrontations over which unplanned and undesirable contract modifications occur.
3. Identify the characteristics of the various devices and techniques that are employed to preclude, prevent or otherwise remedy the confrontations and resulting contract modifications.
4. Identify the size and significance of the relevant set of confrontations and resulting contract modifications.
5. Identify the general causal patterns that tend to create the confrontations and resulting contract modifications.
6. Identify potential approaches toward fundamental improvements.

SCOPE AND METHODOLOGY

Conceptual Approach and Basic Assumptions

The game plan, or conceptual approach of this study, is established in accordance with the preceeding statement of the problem and objectives. It hinges upon the following assumptions which are developed and analyzed throughout the text.

Post award confrontations tend to occur between the Government Contracting Officer and the competitive selected contractor because the technical aspects of the procurement requirements require clarification. Inadequate technical data packages occur for various reasons, which are identified and discussed only briefly in this study; the primary focus and emphasis is upon ineffective transmission of procurement technical requirements which occurs either because:

1. The Government is not fully effective in its role as transmitter of the procurement technical requirements, or because;
2. The newly selected contractors are not fully effective in their roles as recipients and users of the procurement technical requirements.

In pursuit of the specific objectives of the study, the text will examine 1 and 2 above. It will develop and analyze the reasons why the two parties tend to be not fully effective in their respective roles. This conceptual approach mechanically separates the process of acquiring the technical requirements from the process of transmitting them. The conceptual separation is necessary in order to directly study the latter, i.e., the interface between the Government and the new contractor rather than the interface between the Government and the developer/first producer.

It is not entirely possible, however, to neatly accomplish such a mechanical separation. Such a simplistic division encompasses other broad concepts and may impinge upon other more orthodox viewpoints. For example, one chapter identifies and briefly discusses inability to meet rate and delivery schedules, as a technical requirement transfer problem, in a context similar to design defects and missing drawings. The reader may well wonder as to the relevance of such information to the transmission of procurement technical requirements. Such information is identified in this study because it was observed as resulting in unplanned and undesirable contractual modifications and stemming from a breakdown in the technical requirements transfer process. Identification of such factors is one of the objectives of this report. All information is subsequently analyzed to determine its meaningfulness in a like manner.

Sources of Information

In approaching the subject of competitive reprourement and the transmission of procurement technical requirements, a search of the literature revealed that related problems had been previously treated in various ways: the case study, where a selection of individual procurements are qualitatively analyzed; technical data package (TDP) reports, where the elements of the TDP are discussed; management reports; or reports of a theoretical or philosophical nature.

These sources were valuable in developing the test plan for this report, but it was felt their methodology was not appropriate to address the specific problem under examination. The main thrust of this effort is identification--identification of the fundamental nature of the problem, its

characteristics, and its salient causes. In this regard, the only viable research plan was to inquire into actual current or recent individual procurement actions, procurement by procurement, until sufficient exposure evolved to render a basis for empirical analysis. Therefore, the contracts on file at various AMC major subordinate commands provided the most relevant and meaningful source of information. The main effort of the data gathering, findings and analysis is oriented around such actual contracts.

The data were also derived from engineering files, commodity manager's files, pre-award surveys, and various other documentation, as well as interviews with government personnel such as contracting officers, project managers, buyers, production specialists, R&D engineers, QA engineers, DCAS representatives, and some contractor personnel. It should be emphasized that the contracts were selected solely by their applicability to this study. There was no attempt to seek out or avoid problematical procurements. Objectivity was strived for in gathering the data from the various sources and reliance on judgment was minimized.

Methodology

The varied and complex nature of the data required to answer the relevant questions of this study was such that a structured, succinct format was imperative to encompass and contain it. The device that evolved as the keystone of the data-gathering plan was a structured guide for investigating the essential topics of the competitive procurement transmission process. It centered around the issues of the quality of the data packages and the procurement environmental factors. Specifically, every contract was reviewed for:

1. Contract changes regarding time, price and technical parameters.

2. The confrontations resulting in the contract changes.
3. The underlying obstacles causing these confrontations.
4. Procurement devices used to preclude and to overcome the confrontations.
5. Objectives attained and validity of source selection.
6. Pertinent factual data, such as the type of contract, solicitation, pricing arrangement, etc.

The results from the contract data forms were tempered with other inputs from the field and analyzed as described in the analysis section of this report.

Characteristics of the Data Surveyed

Within the competitive contracts selected, concentration has been centered upon procurement actions with the following characteristics:

1. Production contracts were studied as opposed to RDT&E, service, operation and maintenance, construction, etc.
2. Current or recent contracts in process during FY 70 were selected rather than the actions of previous years.
3. Solicitations were 96% multiple sources (57% unrestricted, 39% restricted to firms qualifying as small business), 4% of the contracts were solicited only among limited competitors.
4. Pricing arrangements were of the FFP contract type (including some with escalation provisions). Predominantly, the pricing arrangements were justified by "adequate competition"; price was the primary source selection criteria in 97% of the observations.
5. Contracts that represented initial "shifts" to competition were concentrated upon rather than repetitive actions for the same items.

"Early" reprocurements were also observed and it was noted that the 4th or later reprocurements may also retain the nature of some earlier reprocurements.

6. Prime items, components, and parts were studied, including such items as missiles, vehicles, grenade launchers and radio sets, as well as barrels, triggers, antennas, etc. Major (or prime) items accounted for about 1/3 of the sample surveyed and secondary (or logistics critical) items accounted for about 2/3.

7. The technical complexity was considered to be high in 56% of the sample, slightly less than 44% were of medium complexity, and, of low complexity in a few cases. (This was largely a subjective evaluation depending upon relative difficulty, number of drawings, sub-assemblies, etc. It should be noted that almost any hardware produced for the first few times takes on the attributes of high technical complexity.)

8. About 2/3 of the survey sample was formally advertised and 1/3 were negotiated procurements; some 2-step IFB's are included in the formally advertised sample.

9. Several multi-year procurements were included in the sample.

10. Contracts with varying dollar thresholds were included ranging from \$10,000 to \$50,000,000.

11. Items and parts varied as to unit price which ranged from 64¢ to many thousands of dollars.

Delimited Factors

1. There was no attempt to take a "case study" approach to perform an intense review of each case; yet, to truly diagnose the root causes

of a given problematical procurement action it would be necessary to do this. Efforts were concentrated upon identifying generalized characteristics, causal trends, and patterns. This could only be accomplished by looking at a relatively large number of contracts--approximately 100. A review of the various major subordinate commands indicated that this sample size is a substantial portion of the total relevant procurement actions during FY 70, but not so big nor homogeneous as to be statistically inferential. Statistical inference validity was beyond the scope of this study.

3. The procurement orientation of this report precluded a study of the engineering aspects of the drawings, specifications, and various other elements of the technical data package. Such aspects, therefore, were considered but not pursued to any great depth. As a consequence, "after-the-fact" judgments have not been made on the relative "adequacy" of the data received from the developer or previous source. As an integral aspect, "adequacy" has been considered but only in the sense that it was or was not alleged to be a contributing factor to problems within the procurement actions.

4. It was not practicable to discern all of the critical confrontations in a given contract.

5. It was not practicable to attempt to differentiate between "ability" and "motivation" of the parties. It is recognized that each factor influences the end result but they are not visually separable.

6. It was not practicable to assess the outcome of all contracts because many were in-process at the time of investigation and only limited data were available.

7. The frequencies of categories of confrontations--had to be quantified in a very generalized and subjective manner because the activities during contract performance and administration are dynamic, abstract, technical, interrelating, and complex. They tend to defy specific categorization except under isolated and detailed scrutiny. Such an approach was beyond the scope of this study.

8. The emphasis of the investigation was on those confrontations that did impact with varying visible consequence and in one way or another did result in a modification to the contract. Such a bias tended to de-emphasize those confrontations that were effectively resolved with little or no consequence.

9. While additional work modifications were deliberately excluded from the investigation, some supplemental agreements indirectly involve additional work and therefore a measurable impact of each confrontation was not directly discernable. In addition to excluding the exercise of options, multi-year increments and the like, it should be noted that other types of modifications were also specifically excluded from consideration such as: a change in support items requirements, changes related to incentive provisions, and changes that were clerical in content.

10. Finally, it should be clearly understood, that this was a study of competitive reprocurments and therefore confrontations between the Government and the developer or previous producer were not visible to the investigators. This, too, was an effort beyond the scope of this study.

In the following chapters, the analysis of the problem and data described above, will proceed from an examination of the natural state of transmitting procurement technical requirements, through an account of resultant confrontations and contract modifications and related communication devices culminating in analysis of causal patterns and solution approaches.

Key Definitions

1. Technical Data Package (TDP). A technical description of an item adequate for use in procurement. The description defines the required design configurations and assures adequacy of item performance. It consists of all applicable technical data such as plans, drawings/ associated lists, specifications, standards, models, performance requirements, quality assurance provisions, and packaging data. (Reference AMCR 70-46.)
2. Procurement Package [(PP)]. The information required to obtain bids or proposals. It is comprised of the TDP describing the item or service to be procured together with all applicable administrative, legal, and fiscal provisions as are necessary for a clear and complete description of the item desired and the conditions governing the proposed contractual agreement between the Government and the supplier. (AR 310-25)[(Reference AMCR 70-46.)]
3. Procurement Technical Requirements (PTR's). For the purposes of this study, procurement technical requirements are: requirements for technical or specialized supplies that are not available in the commercial

market place, which are to be procured by detailed technical specifications and drawings of the required physical and performance characteristics. The term encompasses the special quantities required at the scheduled rate and time as determined by both mission needs and technical feasibility. It also includes the functional and procedural requirements established by law and regulation that are generally applicable and especially relevant to the procurement of such technical supplies.

4. Transmission of Procurement Technical Requirements (T/PTR). The activity encompassing the total process of communicating procurement technical requirements. The transmission process consists of the assembly of, the transferring of, and assurance of compliance with the technical and technical-related requirements dictated by the PP and its inclosed TDP.

CHAPTER II

THE NATURE AND GENERAL ASPECTS OF THE PROBLEMS IN TRANSMITTING PROCUREMENT TECHNICAL REQUIREMENTS

The Natural Function and System

The Governmental Role as Transfer Agent

In one typical Government procuring activity, approximately 110 major items and 1,800 spare parts are procured annually. Among these are a number of "first time competitive buys" from new contractors (N-KR's) using technical data prepared by a different organization--either a developer or a previous producer of the hardware (DP-KR). The DP-KR might be an in-house Government organization or an industrial firm or even some combination.

The mission requirements for Military Design Equipment (MDE) emanate from advance procurement planning, programming and budgeting during the R&D phase of the materiel life cycle. Such mission requirements constitute the inputs to the procurement functional process and are issued and funded as procurement work directives (PWD's). The outputs of the process, of course, are items, components and parts of Military Design Equipment to be integrated with full weapons systems and forwarded to Army Field forces. (See Figure 1.)

The natural function is as simple as that--at a relatively high work system level. Below this level, however, the sub-work systems get more involved--such as the system discussed next. It encompasses the Government in the role of transfer agent, specifying to prospective N-KR's how to construct and produce the MDE, selecting one N-KR and arranging a contract to commit each other to a set of mutual promises.

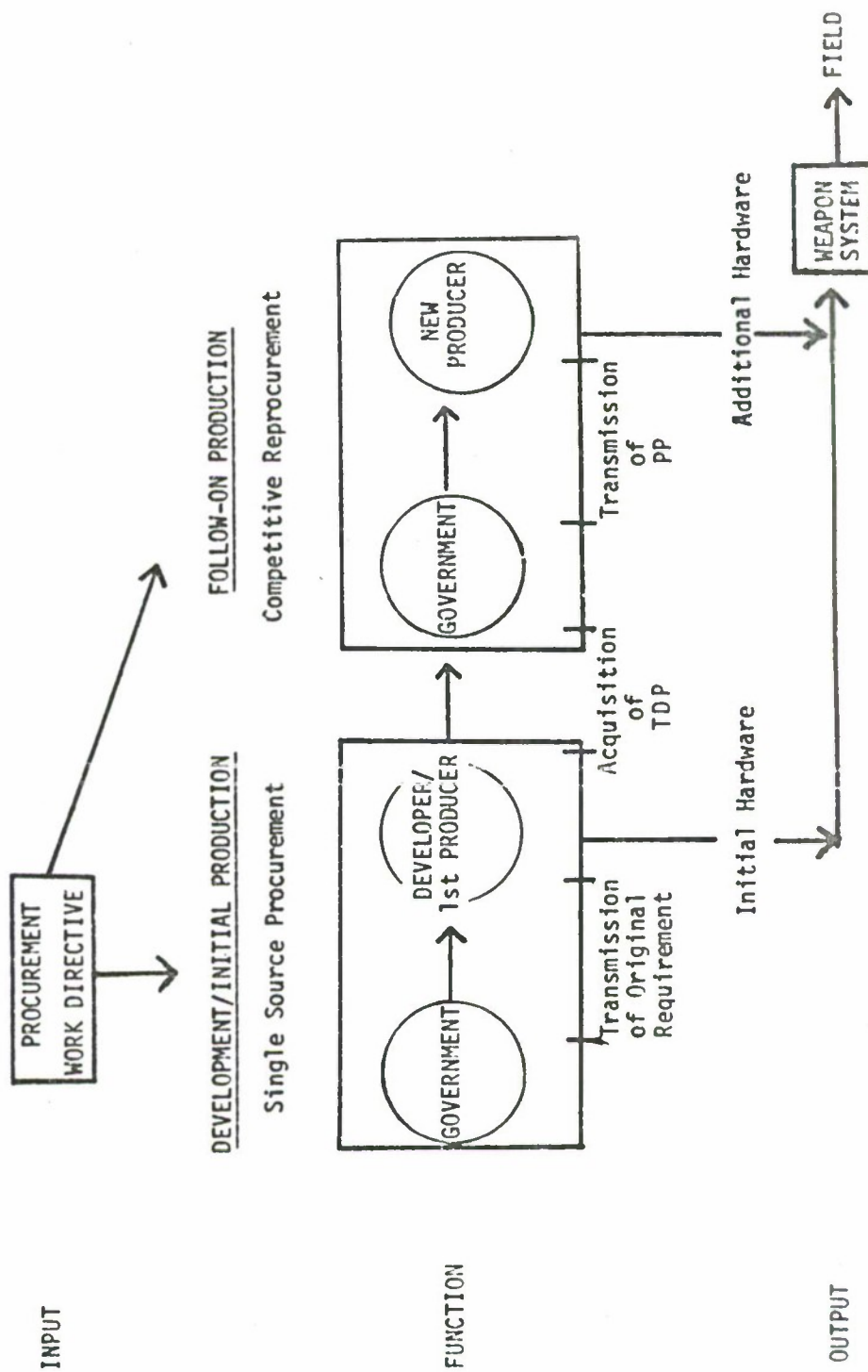


FIGURE 1. Natural Function of Initial and Follow-On Procurement of Military Design Equipment

It has been stated that the system of procuring MDE is perhaps one of the most complex technical-economic-political processes ever evolved.¹ Government procurement is surely constrained in many ways and some of these constraints combine to form the natural system in which the problems of transmitting procurement technical requirements must be reckoned. Three such broad overall constraints are particularly relevant and are identified below.

The Theory of the "Adequate" Technical Data Package to Firmly Specify Technical Requirements.

Successful fixed price competitive reprocurments depend on the premise that each qualified competitor must be able to interpret the intent of the technical requirements in exactly the same way. Without this premise there is little basis for realistic competition. The vehicle for communicating these requirements is the Technical Data Package (TDP). The theory of specifying technical requirements via a TDP is well established and, the practice is largely standardized throughout the Department of Defense. MIL-S-83490, "Specifications, Types and Forms," prescribes general requirements for the preparation of specifications and incorporates (directly and indirectly) the following other documents:

1. MIL-STD-490, "Specification Practices." This is oriented toward program-peculiar specification.
2. MIL-STD-480, "Configuration Control - Engineering Changes, Deviations and Waivers." This applies primarily to prime contractors who participated in the development of the system or high level configuration item.

¹National Security Industrial Association, "Defense Acquisition Study," July 1, 1970, p. v.

3. MIL-STD-481, "Configuration Control - Engineering Changes, Deviations and Waivers (Short Form)." This applies primarily to the procurements most applicable and relevant to this study. That is, it applies to a contractor who did not participate in the development of the item but who receives documentation of technical requirements in order to produce the item. Such a contractor is not familiar with requirements of the system or higher level configuration item; therefore, the major portion of the analysis of the impact of an engineering change proposal on associated items is, necessarily, transferred from that contractor to the procuring activity. MIL-STD-481 is also normally utilized in contracts involving multi-application items not peculiar to specific systems.

4. DOD Manual 4120.3M - "Standardization Policy, Procedures and Instructions."

5. DOD Index of Specifications and Standards (DODISS).

6. MIL-D-1000 - "Drawing, Engineering and Associated Lists."

7. MIL-STD-100 - "Engineering Drawing Practices."

The significance of the documents cited above is that taken together they do comprise the philosophy, objectives, policy, and procedure of acquiring and utilizing technical data to set forth a composite "specification" of procurement technical requirements. The procedures are quite firm and fixed. The language is specific. The technical description is exact. The emphasis is on clear, concise, and unambiguous definitions of all the requirements of the Government for the product to be delivered.¹ The objective is to provide adequate means for

¹Gillespie, Harold H., and Armbruster, Ralph E., The Technical Data Package for Procurement of Military Design Equipment, Society of Automotive Engineers, 1967, p. 1.

procurement and reprocurement without re-development of the design, or recourse to the original design activity, of an item that duplicates the physical and performance characteristics of the original design.

The Fundamental Theory of Firmly Fixing Arrangements as to Price, Time and Technical Requirements.

One most fundamental illustration of a broad overall constraint is the policy of preferring to procure military hardware production via a Firm Fixed Price (FFP) contracting technique. The concept of a FFP contract is almost synonymous with the concept of a "precisely defined" end product, at least in the sense that a seller must know what is wanted before he can price it. In whatever way the requirement may be specified, verbally or with detailed drawings, the specification forms the base upon which the contract is priced. If the base is firm and fixed then the price can be firm and fixed. Conversely, if the end product specification is not particularly firm then the contractual price and corresponding schedules and quality of product tend also to fluctuate. If the buyer or the seller can tolerate deviations in the price, schedule, physical and functional characteristics set forth in a contractual agreement, then perhaps a flexible arrangement can be devised and the definition of the end product can be less precise. Hypothetically, every facet of the arrangement can be stated in approximate terms. By pursuing such rationale it is evident that "doing business" to procure Military Design Equipment could be facilitated substantially. It would be a simple matter of describing "approximately" what is wanted, when it is wanted, what it is to look like, how it is to functionally perform, and where it

is to be delivered. In exchange for a promise to provide such supplies an "approximate" price could be determined.

The logic of such a method of doing business, in most procurement situations, is clearly not acceptable to responsible managers--buyers or sellers. It is abhorrent to think in terms of approximate quantities of MDE, of approximate quality, in a state of approximate readiness to meet defense demands. It is equally abhorrent to contemplate approximate taxes, cost recovery, paychecks and profits. Yet, therein is the source and destination of the funds expended on "approximate" pricing of "approximate" work. "Profit" per se is justified by the reasonable assumption of marginal uncertainty and risks for a fixed price. The seller increases or decreases his profit in proportion to his managerial efficiency. In this scheme the seller is assured of the fixed price for the supplies required and can plan and budget accordingly. The Armed Services Procurement Regulation (ASPR) reflects a distinct preference for fixed price contracting to harness this profit motive and the cost reimbursement method is sanctioned only when the uncertainties are of such magnitude that cost... "cannot be estimated with sufficient reasonableness to use any type of a fixed price contract"¹ (e.g., in R&D phase of the life cycle).

Once a fixed price contract has been arranged, each party has an obligation to the integrity of his own role to insist that the other party adhere, if not to the letter, at least to the spirit of strict compliance with its fundamental promises.

¹Armed Services Procurement Regulation 3-405.1(b)

The Armed Services Board of Contract Appeals (ASBCA) has repeatedly upheld terminations of contracts for defaulting such promises; it has also repeatedly upheld the concept of implied warranty; i.e., if the contractor follows the detailed drawings it is implied that he will achieve a physically and functionally satisfactory product.¹

The Theory of "Responsibility" in Selecting a Contractor to Perform the Work.

The theory of selecting responsible contractors is also well established and proceduralized throughout the Department of Defense. The ASPR paragraphs 1-902, 1-903, and 1-904 prescribe policy, standards and procedures for determining the responsibility of prospective contractors.

The standards that a prospective contractor must meet to qualify as "responsible" are generalized as follows:

1. Minimum Standards.

Have adequate financial resources; be able to comply with the delivery schedule, have a satisfactory record of performance; have a satisfactory record of integrity; and be otherwise qualified and eligible to receive an award under applicable laws and regulations.

2. Additional Standards for Production.

Have the necessary organization, experience, operational controls and technical skills; have the necessary production, construction, and technical equipment and facilities.

¹AMCP 715-6, Preproduction Evaluation Contracts, p. A-6.

3. Special Standards.

When the situation warrants, such as where a history of unsatisfactory performance has demonstrated the need for insuring the existence of unusual expertise or specialized facilities necessary for adequate contract performance, special standards may be developed and set forth in the solicitation and shall be applicable to all bidders or offerors.

The significance of these policies and standards is that they do restrict awards of purchases and contracts to responsible contractors only, based upon the following rationale:

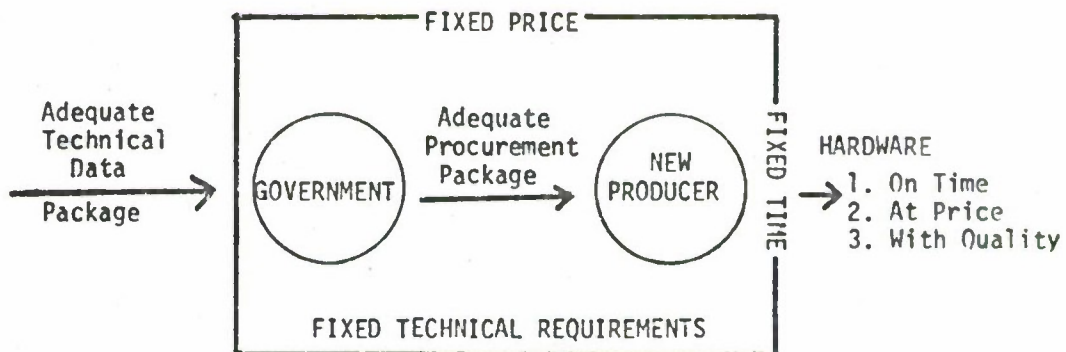
The award of a contract to a supplier based on lowest evaluated price alone can be false economy if there is a subsequent default, late deliveries, or other unsatisfactory performance resulting in additional procurement or administrative costs. While it is important that Government purchases be made at the lowest price, this does not require an award to a supplier solely because he submits the lowest bid or offer. A prospective contractor must demonstrate affirmatively his responsibility, including, when necessary, that of his proposed sub-contractors.¹

A Synthesis of the Function and the System

The set of four very fundamental theories identified above constitute a natural system for doing business to repro cure and reproduce Military Design Equipment in a routine and normal manner. The essence of that scheme is set forth below (see Figure 2):

1. The Government determines its quantity, quality, and schedule requirements for a given item to be repro cured.

¹ Armed Services Procurement Regulation 1-902.



FIRM FIXED PRICE CONTRACT BASED UPON:

1. Government as Transfer Agent
2. Adequate Procurement Package
3. Fixed Arrangements: Price, Time, Technical
4. Responsible Contractor

FIGURE 2. Natural System of Transmitting Procurement Technical Requirements in Reprocurements of Military Design Equipment

2. The Government gathers together the technical documentation describing the detailed characteristics of the item and related work. This description is in the form of a TDP consisting of a product specification, engineering drawings and associated lists, and related documents. The TDP may have emanated from an industrial contractor or an in-house Government laboratory. The item may have recently evolved through the materiel life cycle from the RDT&E phase and first production (limited or full run quantities) or it may be an item of older vintage that has undergone product improvement. It may have been produced once or several times, and by only a single contractor or by several different contractors. It may be an exact replication of the previous produced item or it may differ slightly.

3. The Government transmits the set of requirements in the form of a procurement package (PP) containing the TDP and all ancillary documentation. It transmits the PP to a multiple source market place and solicits competitive bids and offers to produce the item:

4. Prospective contractors promise to reproduce the item identically within specified tolerances, and perform the related work exactly as specified and quote their price for doing it.

5. The Government selects the one contractor whose price is lowest among the competitors and whose promises can be relied upon based on a deliberate evaluation and determination of responsibility.

6. The parties mutually enter into a contract that is normally firm and fixed as to technical quality aspects of the work, the quantities, schedule, price and related terms and conditions.

7. Certain changes can be directed by the Government, if necessary and justified, and the contract can be modified by supplemental mutual agreement. Such modification represents an addition to or a revision of the initial agreement.

8. The contractor performs the work as promised by reprocurring the item in the quantity and quality promised within the time frame promised.

9. The contractor delivers the items.

10. The Government inspects, accepts and pays the promised price.

The above system applies to large and small reprocurments whether the aspect under consideration is dollar value, unit price, complexity, difficulty, criticality, time, method or place of performance. As long as the procurement requirements are for production of specialized technical supplies it illustrates the normal and natural method of doing business. It is an "ideal" system--establishing a steady state of affairs--and theoretically both buyer and seller should be content with it. It is a system proven to be sound and effective. It saves money. It expands the sources of supply. It is fair and equitable to all competitors. It demonstrates the feasibility of seeking competition.

The underlying assumptions of this study are: That the system ceases to be sound, fair and effective when the contract, for various reasons, undergoes unplanned and undesirable modifications, restructuring or termination and; that such modifications do occur with a frequency and severity that is not acceptable--especially in "first competitive buys."

The Overt Nature of the Problem

The natural transmittal function of receiving and sending procurement technical requirements is tantamount to "transferring a production line." The difference is that it cannot be transferred literally and physically and therefore must be transferred by some form of documentation. The natural system set up to accomplish the function is such that the documentation forms the understanding between the parties and the understanding forms the contract.

When a procuring activity attempts to "transfer a production line," however, it frequently experiences frustrating post-award confrontations over technical understandings (or misunderstandings) with attendant "out of contract" cost incurrence and untenable delays. That is, the ideal "steady state" does not remain fixed! It changes. The changes have varying consequences, the impact of which must be absorbed or allocated in some way to one or the other of the contractual parties. These consequences frequently necessitate a modification, a complete restructuring of the contract parameters, a partial, or even full termination of the contract--all of which are unplanned and usually undesirable.¹ See Figure 3.

The severity of impact of many such confrontations is of sufficient magnitude to "slip" a major program or operation, and to "write-off" any

¹Recent experience in the Court of Claims (Air-A-Plane Corporation vs. U.S., 14 March 1969) has served notice that the contractor's remedies for an excessive number of documentation changes, after award of contract, was not limited to an equitable adjustment under the changes and disputes clauses of the contract. The ordering of an excessive number of changes by the Government could be interpreted as a (1) breach of contract by the Government; (2) misrepresentation by the Government; or, (3) result in a court-ordered reformation of the contract to a cost reimbursement type. Source: MICOM briefing notes on Preproduction Evaluation contracts.

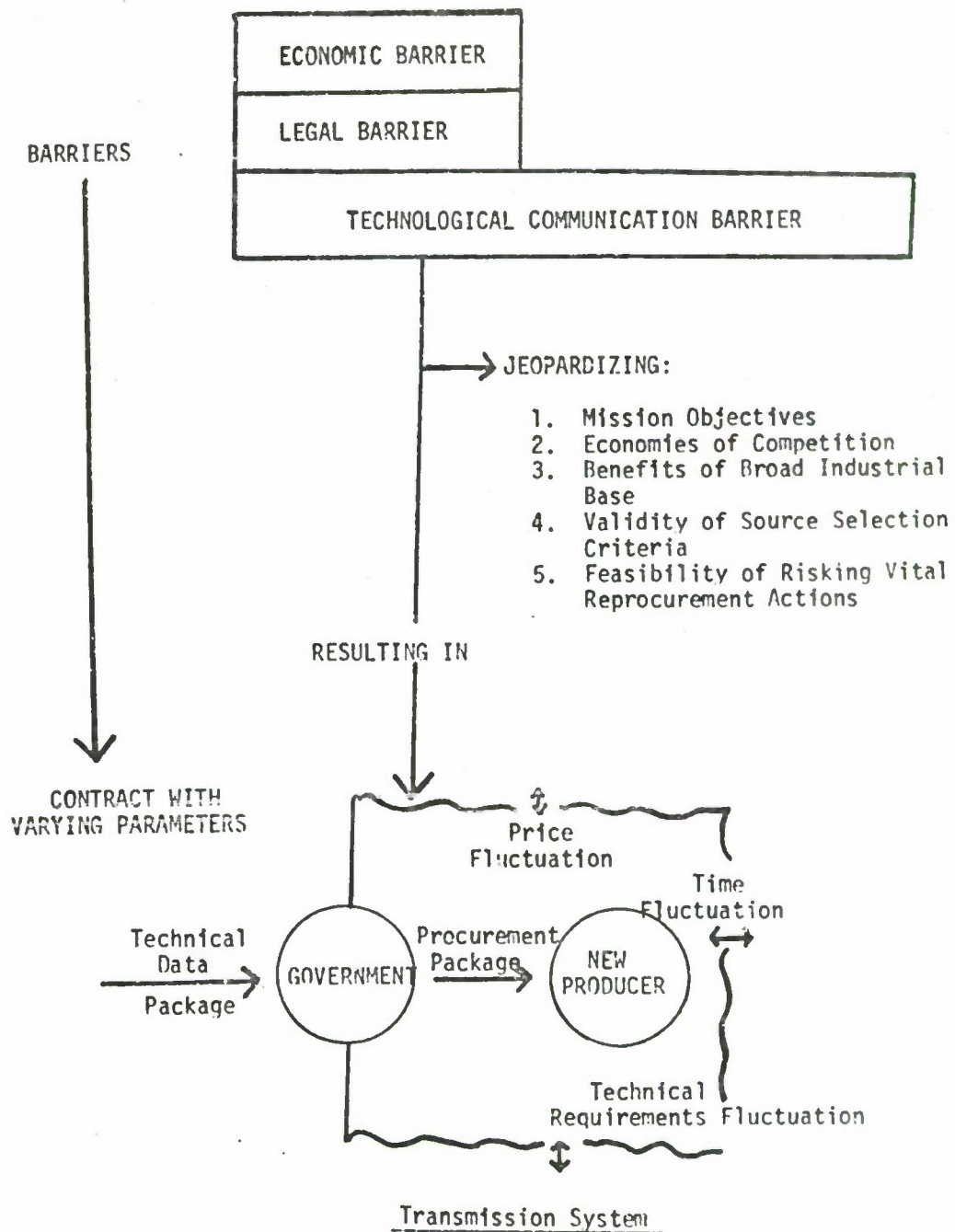


FIGURE 3. Overt Problem

savings in unit price attributable to procuring competitively. If the new competitively selected source must "return" to the DP-KR (directly or indirectly through the procuring activity) to seek help in completing his contract, it is cause for "wonder" whether sources of supply have really increased. A "second low" bidder or offeror might also justly wonder why he was not initially awarded the contract when ultimately it took longer and cost more to buy from the original low bidder. In a critical or vital project--the "fear" of encountering such dilemmas can tip the scale in a trade-off decision over procurement methodology toward the safety and security of single source procurement. Until the Government "transfers the production line" several times, the overt nature of the problem indicates that such post-award confrontations will occur with a significantly greater frequency when awarding to new contractors than if reprocured from the developer/previous producer or a previous sub-contractor. (See Figure 4.)

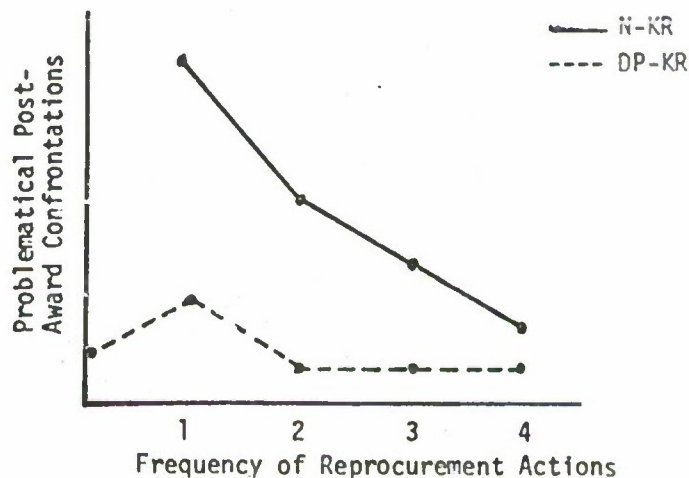


FIGURE 4. Relative Magnitude of Post-Award Confrontations In Competitive Reprocurements of Military Design Equipment (Hypothesized)

One observation is that Figure 4 resembles the concept of learning curves and that the frequency of problems experienced in first time competitive buys are typical of the learning process of man. But such a rationale conflicts with the theory of specifying via a full design disclosure package. This theory holds that the Category E, MIL-D-1000, drawings and related specifications will be of such adequacy as to permit any reasonably competent source to identically reproduce the item without recourse to the DP-KR and within the parameters of a fixed price contract. The premise is that the costs of learning have already been funded once and should not be funded a second time, especially under "open market" competitive auspices. To insure this position the evolution of many items is routed through Advance Production Engineering (APE), Limited Production (LP), educational contracts and orders, single source initial (full) quantity production runs, and many other devices are used. (See Chapter IV.) The occurrence of frequent and severe problems during the first competitive buy are clearly unplanned, and undesirable--notwithstanding the learning process of man.

The Natural Barrier

As stated in Chapter I, the competitive potential of MDE is lower than desirable. Several barriers naturally restrict the use of technical data to achieve competition. If the rights in data have been developed at private expense or are protected by patents, the data is not available for competitive purposes.¹ Similarly, if the circumstances are such that

¹Armed Services Procurement Regulation, Section 9.

it is not cost effective to fund the start up of a new production line, then the competitive data per se is irrelevant.

However, if rights in technical data are legally owned by the Government, and competitive savings are in the offing, it is incumbent upon managers at all levels to take prompt and thorough action to plan for, report status of, review, and revise the applicable technical data in such a way that it is available in a timely and suitable manner for scheduled reprocurments. This means that the data must be adequately acquired, stored, maintained and retrieved for use at the proper time.¹ When utilized, it must be coherently combined with related data and compiled into a procurement package; disseminated among prospective competitors; used to consummate, perform, and administer the contract; and finally, it must be used to inspect and accept the outputs of the contract.

As an integral part of the natural system the TDP is the essential medium for the total communication task. A TDP may be defined in many ways but the following definition lucidly emphasizes the function it performs as a communication technique:

The Technical Data Package may thus be defined as that documentation containing all the design disclosure data, specifications, quality assurance provisions, and acceptance criteria necessary for the full and complete item description, item procurement, item manufacture, and item acceptance. It is the engineer's basic instrument for technical analysis and evaluation. It is the Government contracting officer's means of providing an equitable basis for competitive bidding. It is the contractor's official documentation for bid purposes, for make or buy decisions, for estimating, for vendor item purchasing, for specialty house procurement, and for production engineering. It is the Government inspector's bible for acceptance of the item.²

¹AMCR 70-46, Technical Data Package and Procurement and Production of AMC Material, p. 2.

²Gillespie - Armbruster Report, p. 1.

Thus the data package performs many functions among and between people of differing disciplines each with differing short run objectives at different sequential steps in the entire process. Implicit in this fact is the common-sense intuition that it is very difficult to perform the total effort well--i.e., to communicate adequately and effectively in all the overlapping steps, stages, disciplines and functional areas--especially in view of the complexity of the TDP. It forms a natural barrier.

Several hypothetical "causes" of the problems in competitive procurements of MDE emerge from study of problem symptoms found in the field. Due to the singular viewpoint of the cited causes, however, these hypothetical causes primarily serve to identify particular obstacles that exist within the total technological communication barrier. These obstacles are the subject of the next section.

The Nature of the Obstacles

The Dichotomy of Opinion.

When the question is asked, "Why does the Government have so much trouble with first time competitive buys?"--almost everyone in the business has an immediate response as if a personal sore spot had been touched. A recent ASPR Committee Case candidly identifies this issue:

Historically contractors have blamed their failures on data furnished by the Government whether such data was generated in Government laboratories or in the developing or producing contractor's organization. Under these circumstances the Government has contracted for, reviewed and policed the furnishings of data...

[the Government serves in the] role as a middleman...between two contractors, each blaming the other and the Government for failures to produce.¹

The main question of this study is not "Who is to blame?" or even "why did it fail?"--but rather "what might the Government do to improve the matter?" Therefore, it is important to recognize that a dichotomy of opinion does exist with a set of hypothetical viewpoints on each side.

At the time of release of the TDP for use in a competitive solicitation, the adequacy of the TDP must be evaluated and determined to be sufficient for the purpose intended. Yet, when production dilemmas occur the new contractor frequently (perhaps predominantly) cites the adequacy of the TDP as the cause of his trouble; he alleges that errors, omissions, and deficiencies within the recorded data have caused him to incur extra costs or time or both; such "extras" are held to be over and above that which was promised in contractual commitments, and therefore such burdens should be borne by the Government.

On the other hand, the Government technical personnel often contest such allegations, holding firm to their original determinations as to the adequacy of the TDP. They attest that other factors not related to the adequacy of the data package per se are the cause of the production dilemmas--factors such as practical administrative considerations like urgency or timing, selection of the contractor, or varying abilities of other parties to perform their respective roles. Such factors relate to the procurement environment rather than directly to the adequacy of the TDP.

¹ASPR Committee Case 69-65.

Thus the dichotomy is formed wherein the controversy centers on whether the adequacy of the TDP was sufficient for competitive reprocurement. The problem manifests itself as a violation of the time and/or cost constraints of a contract. But, the predominant cause and the specific nature of the problem are speculative only. For example, an engineer may feel that the contracting officer should have negotiated around the technical troubles; the contracting officer may feel the engineer should have corrected the troubles in the first place. It can be assumed that each party has a degree of merit to its arguments. Yet, it is categorical that the transfer process has been ineffective and that the benefits of competition have been diluted. There is some inability to identify with reasonable assurance how and why the transfer was ineffective.

The issues stratified into two fundamental hypotheses: one hypothesis addresses factors relating to the "acquisition" of adequate documentation from the RDT&E and initial production phases of the life cycle ("A" factors); the other hypothesis encompasses factors relating to the effective "transmission" of the documentation within the given procurement environment. ("T" factors.)

It might be noted that the characteristics most often addressed in the analysis of the "A-Factors" relate to technical accuracy, completeness of documentation, and similar purely technical characteristics. In the other hypothesis, the "T-Factors" relate to environment characteristics which are not usually regarded as being technical in nature. (See Figure 5.)

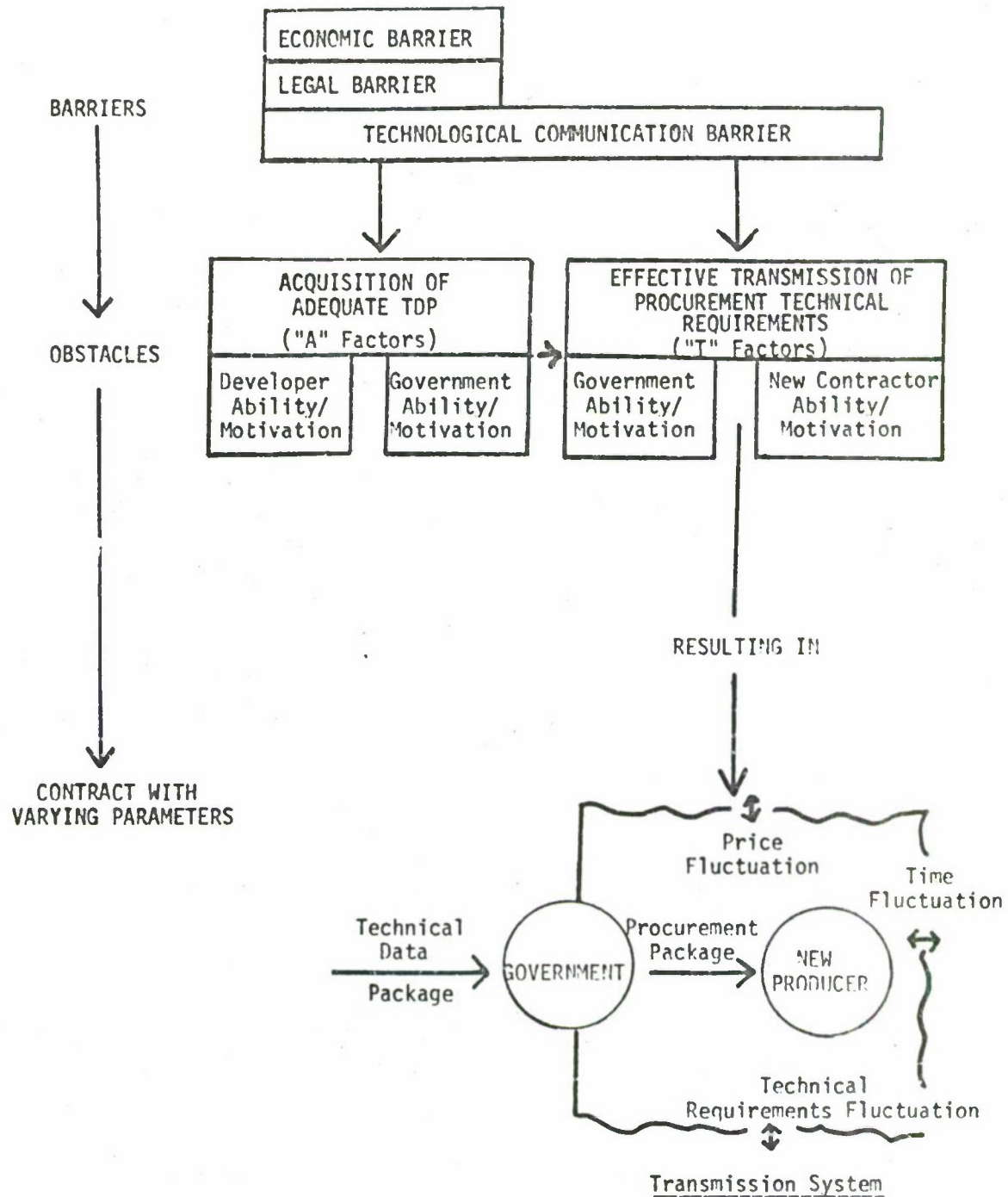


FIGURE 5. Problem With Introduction of Natural Obstacles

The Viewpoints of Those Citing "A" Factors (Acquisition).

The viewpoints of practitioners alleging "A" factors as the pre-dominant nemeses were of deep conviction and well seasoned with experience. They suspect that the logic of the "system" whereby the Government acquires technical documentation is somehow faulty. The illustrative rationale runs a gamut of examples, some of which are briefly described below:

1. The full design and manufacturing technology of a highly complex item cannot be fully disclosed and documented. Some marginal degree of knowledge (e.g., tidbits of operational information) which might be labeled "know-how", will always be locked in the memories of key people and will never be amenable to documentation. Esoteric practices (e.g., using artesian well water to clear electron tubes)¹ that exist within the plant of the developer or previous producer are also not subject to documentation. Minor improvisations of the bench level machinist or assembler to achieve acceptable item performance (and to help the design engineer out of a dilemma) may never filter back to the designer for incorporation into the data package. Commercial improvements to vendor specialty parts may conflict with other parts of the equipment. To the extent that such knowledge is essential to successful reproduction of the equipment, the documentation package will remain inadequate.

2. The voluminous mass of data that is typically necessary in procurements of MDE--when coupled with the inherent demand for exacting detail on each piece of technical data--equals a required degree of

¹General Accounting Office, Evaluation of Two Proposed Methods for Enhancing Competition in Weapon Systems Procurement. Comptroller General of U.S., July 1969, p. 38.

specificity that is unrealistic when one considers that human beings must set forth such documentation. To render it error free and purified of defects is a near superhuman task. Rework and still additional rework is not a solution, for such efforts soon collide with the law of diminishing returns. The detrimental effect is compounded if the errors are "latent" (hidden)--such as an adverse tolerance buildup in complex interacting mechanisms--rather than "patent" defects which are reasonably apparent upon review and inspection of prototypes and items manufactured to the drawings. Costly quantity production and rework may be the only way to reveal such latent defects.

3. In keeping with the rationale cited above, the people responsible for checking, reviewing, inspecting, and accepting the voluminous data set forth in exacting detail are implicitly charged with a similar near superhuman responsibility. To perform their task to the utmost would demand reverse engineering and duplication of each minute computation and decision. This point is illustrated by the following excerpt:

"It has been determined by sampling methods that the average drawing requires the checker to make 120 separate technical judgments and computations. The technical data package for the T208 Mount comprises 253 drawings, exclusive of engineering parts list, supplementary quality assurance provisions (SQAP) and inspection equipment data. The checking of the drawings, therefore, involves an estimated 30,360 separate judgments and computations. An [acceptable] error rate of two-tenths of 1% would permit 61 checking errors of varying degree of significance..."¹

¹General Accounting Office, Unnecessary Costs Incurred in the Production of T208 Telescope Mounts as a Result of an Inaccurate and Incomplete Technical Data Package, April 1965, p. 28.

4. Except where a process is known to be essential, the procuring activity does not attempt to dictate the processes of fabrication, assembly, and test; it desirably and deliberately solicits entrepreneurial process ingenuity from the various competitors. Accordingly, five firms could use five differing processes to achieve the specified physical and functional characteristics. But the documented technical data of one firm may not be relevant or compatible with the needs of another firm (e.g., numerically controlled automated machine processing data).

5. The very nature of equipment developed peculiarly for the military is such that the documentation of the design, production engineering, and quality assurance provisions are typically in a relative state of flux just at the time competitive reprourement is planned. This state of nature occurs because user field reports, safety and value engineering reports, testing reports,¹ and the like, all combine rather simultaneously and suggest correction of deficiencies and improvements to the product and quality assurance provisions just after the initial hardware has been fielded. Such activity tends to coincide with the timing of planned repro procurements. To the extent that approved changes or even planned changes to the data are not incorporated into the repro procurement data package, it will in fact, be inadequate for production of the desired equipment.

¹For example, in one discussion of various tests and reviews the statement was made that "none or few of the tests get coordinated well and some of which are redundant or ineffective and all of which do not tend to be documented well nor the knowledge well disseminated. Proceduralizing the various reviews and tests is a top level management problem."

6. The motivation of the developer of the documentation works at cross purposes under some conditions. On the one hand, he naturally desires to perform well under his contract and yield a "high quality" TDP: on the other hand, he may be motivated to enhance his position as a competitor for the follow-on reprocurments--which may induce him to "drag his feet" and reluctantly furnish something less than a "high quality" set of documentation. It has long been a struggle to put teeth in the "warranty of technical data" ASPR clause,¹ and to enforce the schedule data in a TDP contract.

7. Still further, the stimulus of malmotivation of the developer of the TDP may encourage him or his sub-contractor to include proprietary data in the item he is developing; or, to utilize proprietary components where non-proprietary components would serve equally well; or to classify and mark data as proprietary when in fact it is not. To the extent that the TDP contains such data the developer/first producer is insured of participation and perhaps favored position in follow-on production contracts. Such data may even be inadequate, in fact, for genuine competition.

8. If the R&D contractor is distinctly "development" rather than "production" oriented, this too, it is alleged, can influence the adequacy of the data package.

The Viewpoints of Those Citing "T" Factors (Transmission).

On the other hand, the viewpoint of the practitioners alleging "T-Factors" as the predominant nemeses are also of deep conviction and

¹Armed Services Procurement Regulation 7-105.8.

well seasoned with experience. They suspect faulty logic in the "system" of transmitting and utilizing the technical documentation to procure hardware. The illustrative rationale also runs a gamut of examples, some of which are briefly described below:

1. If the procuring activity selects a new contractor that is a marginal or poor producer, the relative adequacy of the TDP is not likely to alter his pattern of performance. Even if his pattern of performance is good, his ability to understand and use the subject technology may be relatively low while the requirements of the task may be relatively high; such a situation would impair, if not preclude, satisfactory performance. Empirical examples are commonplace wherein one contractor fails while another achieves exemplary performance with the same data package. It is also commonly observed that a known relatively low quality TDP will not significantly deter a high quality producer in the performance of his contract. Thus, a common opinion is that a "good" TDP in the hands of a "bad" contractor will likely result in a "bad" contract; and a "bad" TDP in the hands of a "good" contractor will likely result in a "good" contract. This opinion holds that it all depends upon who is interpreting and using the technical documentation. The relative ability of the new contractor is of paramount importance to effective transmission of the TDP.

2. Adverse motivational pressures can be created when an anxious offeror quotes a price too low as a result of: (a) overoptimism; (b) underestimating the necessary man hours, material, tooling, complexity, or leadtime; (c) perceiving an "opportunity" to enhance his profit

potential. Such a condition can also be created when a potential contractor deliberately underbids and "buys-in" either on price or the time schedule, hoping to recover from his adverse posture during contract performance. In short, such a contractor may initially or subsequently plan to "get well" on modifications to the contract; accordingly, he may plan to find fault with the TDP. Historically it has not been especially difficult to locate the existence of defects and justify demands. Usually it was a simple matter of selecting a drawing and charging an engineer to find a defect that is negotiable. The relative motivation of the new contractor is also of paramount importance to effective transmission of the TDP.

3. All reprocurement actions do not consist of neatly arranged configurations and time phased production baselines. Many actions are assemblages of varying items and components in differing states of descriptive readiness. Marginal increments of additional design, production, and test engineering are not infrequently required in such cases to successfully produce the equipment. Such increments of extra effort are not necessarily exotic requirements. But a qualified and perhaps diversified pool of engineering talent is desirable and often a necessary prerequisite to successful performance of such a contract. In supply contracts, however, the Government normally emphasizes "price" as the principle source selection criteria. Such emphasis encourages the bidder who happens to have a low overhead but may not have a pool of such resources and discourages the bidder with a higher overhead who often does have such a pool. Even if both types of bidders compete, the contractor with a lower overhead frequently wins the award--for it is difficult to assess

the relative engineering expertise of a given firm and to justify rejection of his low bid. The integrity of the competitive bidding process demands that an award be made unless contrary evidence is clear. To the extent that special talents or resources are necessary but not available to the N-KR, the transmission of procurement technical requirements will not be effective.

4. Critics persist, (perhaps with merit) in alleging that the Government is guilty of bureaucratic bungling in its role as transfer agent. Over and above the normal needs for flexibility in changing the contract, it is charged that the Government delays and impedes contract performance by its arbitrariness; by failure to make timely decisions and approval actions; by furnishing untimely and unsuitable tooling and equipment; by providing ineffective technical assistance; by demanding unreasonable efforts to attain quality assurance--especially in the area of first article testing; and so forth. Yet, the TDP scheme is predicated on the assumption that such matters will be effectively coordinated and administered. To the extent that such allegations are justified, the transmission of procurement technical requirements--by implied definition--will not be effective.

5. It is also pointed out that certain environmental circumstances often preclude "steady state" contract performance. The terms of some contracts are not necessarily compatible with mission objectives. Priorities and motivational pressures are often conflicting. Circumstances and conditions peculiar to a given procurement action, e.g., strikes, Acts of God, and other unforeseeable events (whether excusable or non-excusable)

all combine to exert a distinct impact on the outcome of contractual performance. If the conditions of use are not as initially intended, effective transmission of procurement technical requirements is seriously impeded.

Rationale For The Selection Of The "T-Factor" Hypothesis

Each hypothetical cause of the problem identified above would readily justify an in-depth study or series of studies to enhance overall understanding, and of course, each is a major effort. The subject of improving the "adequacy" of the technical data package has been under continuous study with a research and engineering approach by another AMC organizational unit.¹ The approach herein is procurement and production oriented, and the "T-Factor" hypothesis was selected for examination in further depth to identify the patterns of post-award confrontations. This does not mean, however, that the issue of adequacy will not be discussed. It is those confrontations over adequacy between the government and the developer that will not be covered in this report.

Several improvements to enhance the procedure for acquiring quality TDP's have been very recently introduced. It is possible that any prevailing popular conception that data packages are generally of low adequacy is akin to a misconception. It may well be a matter of phased

¹Refer to Task 23 of AMC's Program for the Refinement of the Materiel Acquisition Process (PROMAP).

implementation of the recent but existing improvements in technology. The "T-Factor" hypothesis, on the other hand, is a relatively unexplored area in the current literature.

Along this line a particular question deserves an answer: Why does the Government so often expect that single source procurements will be trouble free and competitive reprocurements will be troublesome in spite of the fact that the same TDP would be used by either contractor. That is, in a given procurement action, the Government could decide to remain in a single source posture with the developer or previous producer. It is expected that if they do so, many of the potential troubles will be avoided because:

- a. The "adequacy" of the TDP would likely have been sufficient because the previous producer had already built hardware with it.

- b. The "ability" of the contractor would have been "effective" because he had already demonstrated his ability.

- c. The motivational posture of the contractor would likely have been "effective" because of his bargaining power to negotiate an acceptable price.

- d. The terms and conditions of the contract would likely have been "effective" for the same reason cited above.

If the Government had let the award to the previous source (or sub-contractor) as a result of winning a competitive solicitation, the above assumptions would likely hold true--by virtue of that contractor's

previous knowledge of costs, rates, time and minimum constraints. The only potentially uncontrollable factor would be subsequent circumstances such as necessary Government intervention or normal business uncertainties. Thus, on the one hand, a procuring activity could expect a relatively fixed contract with the developer/previous source; and, on the other, an aberrating performance with a new contractor. It would be something of a surprise if the performance results were the opposite. Yet in both cases the same TDP would be applicable. This rationale highlights the suggestion that the transmission process is ineffective in some way.

Moreover, it can be assumed in a given reprocurement action that the economic barriers (e.g., start up costs) would have been reasonably evaluated prior to a determination to solicit competition. In addition, the legal barriers (e.g., patents and Limited Rights in Data) would have been assessed.

Still further, the technological barrier (the hurdle of transmitting complex knowledge and techniques from one source to another) would have been half way overcome by reason of the fact that a TDP was already acquired from the one source and a determination already made as to its adequacy for intended use in competitive reprocurement. The very action of selecting a competitive procurement mode implies that the only remaining hurdle to the attainment of the benefits of competition is to cross the other half of the technological barrier and communicate the available documented information to a new source of supply. This

implies that the problems in "first competitive buys" are related to the last half of the hurdle.

The next chapter examines the "T-Factor" hypothesis under empirical conditions to identify salient patterns and characteristics of the confrontations that occurred in 100 actual individual procurement actions during Fiscal Year 1970. The purpose is to subjectively measure the significance and validity of the "T-Factor" hypothesis.

CHAPTER III

THE CHARACTERISTICS OF THE CONFRONTATIONS OVER WHICH UNPLANNED AND UNDESIRABLE CONTRACT MODIFICATIONS OCCUR

Introductory Discussion

A fundamental premise at the outset of this study was that the "confrontations" between the Procuring Contracting Officer (PCO) and the new contractor (N-KR), and their respective team members would provide insight to after-the-fact investigators as to the adequacy and effectiveness of the communication that took place as they formulated the contract. It was assumed that this knowledge would help to understand the overall technological communication barrier evident in first competitive buys.

For the purpose of the inquiry, the events studied were defined as post award confrontations between the Contracting Officer and the contractor to clarify and resolve technical/administrative disagreements and misunderstandings (see Figure 6). The consequences of the confrontations are shown in Figure 7.

Almost all confrontations observed fell into the pattern blocks of Figure 8 and Figure 9. Furthermore, each element within each pattern block was observed at least once to have directly or indirectly resulted in a modification to a contract; i.e., each idea within each block could be said to represent a "point of confrontation" between the PCO and the N-KR. Appendix A is a list of sample contracts studied and the confrontations noted therein.

Confrontations Over the Timeliness and Suitability Of the Government Contracting Officer's Performance: New Contractor Confronts the Government

The Government Contracting Officer's contribution to the overall communication problem in transmitting procurement technical requirements--

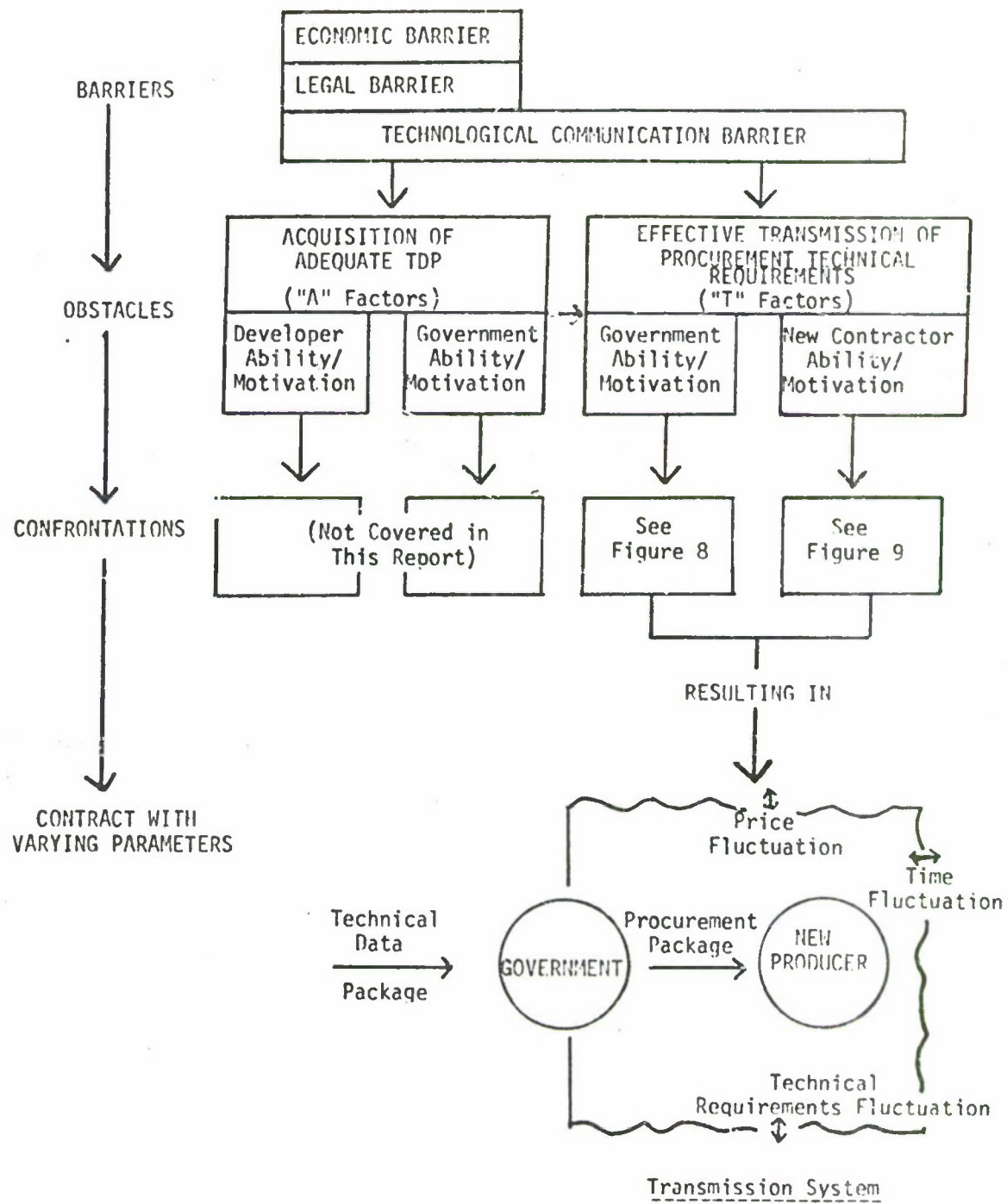


FIGURE 6. Problem With Introduction of Confrontations

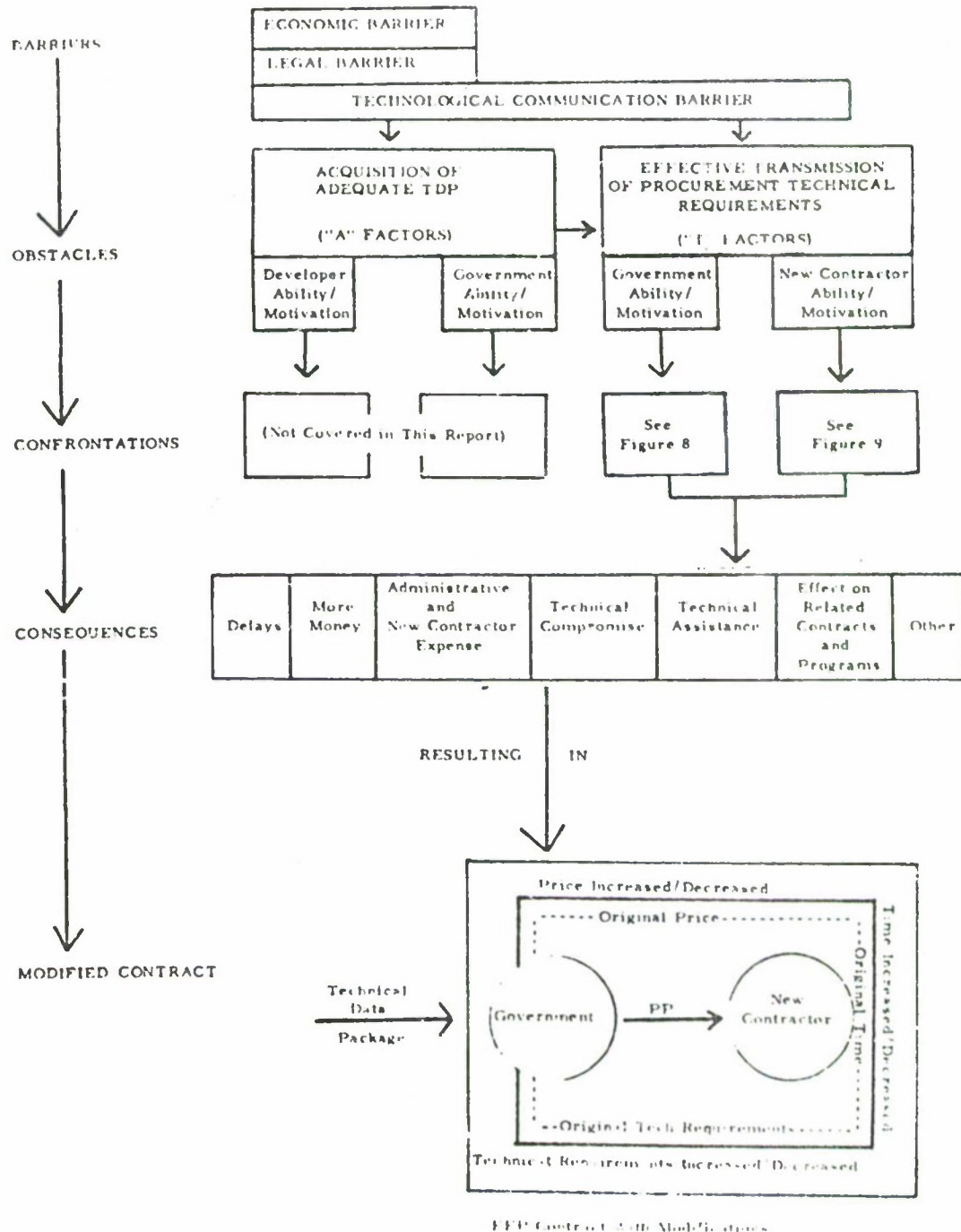


FIGURE 7 Problem with Interpretation of Consequences and Modifications to Contract

in addition to starting with a potentially inadequate TDP--was by not being timely and suitable in compiling the procurement package, controlling and processing engineering changes, furnishing Government property, administering the contract, and inspecting and accepting the item. In addition, the contracting officer was obliged to react to and often absorbed the brunt of the consequences of precluding circumstances such as strikes. (See Figure 8).

Although it is not intended to list or relate each element of data gathered, several examples with some discussion may serve to clarify the characteristics of the confrontations that did occur and which were observed through after-the-fact investigation.

Incorporating the TDP into a Procurement Package.

The Procurement Package (PP) is a composite of the TDP plus related data; Figure 8 provides a descriptive overview of the kinds of data included; e.g., specifications, drawings, SQAP's, etc. Each kind of data should be adequate, accurate, current, complete and clear--or else a confrontation will likely occur during contract performance. Note: Although the terms TDP and PP are used in this report on what may seem an interchangeable basis, the reader should remember that the TDP is the essential part of the PP and either can be uniquely appropriate at a given time.

1. Adequacy.

While it is practically everybody's business on the PCO's team to continuously assess the adequacy of a TDP to be used for competitive reprourement, a number of contracts were observed where the adequacy of the TDP

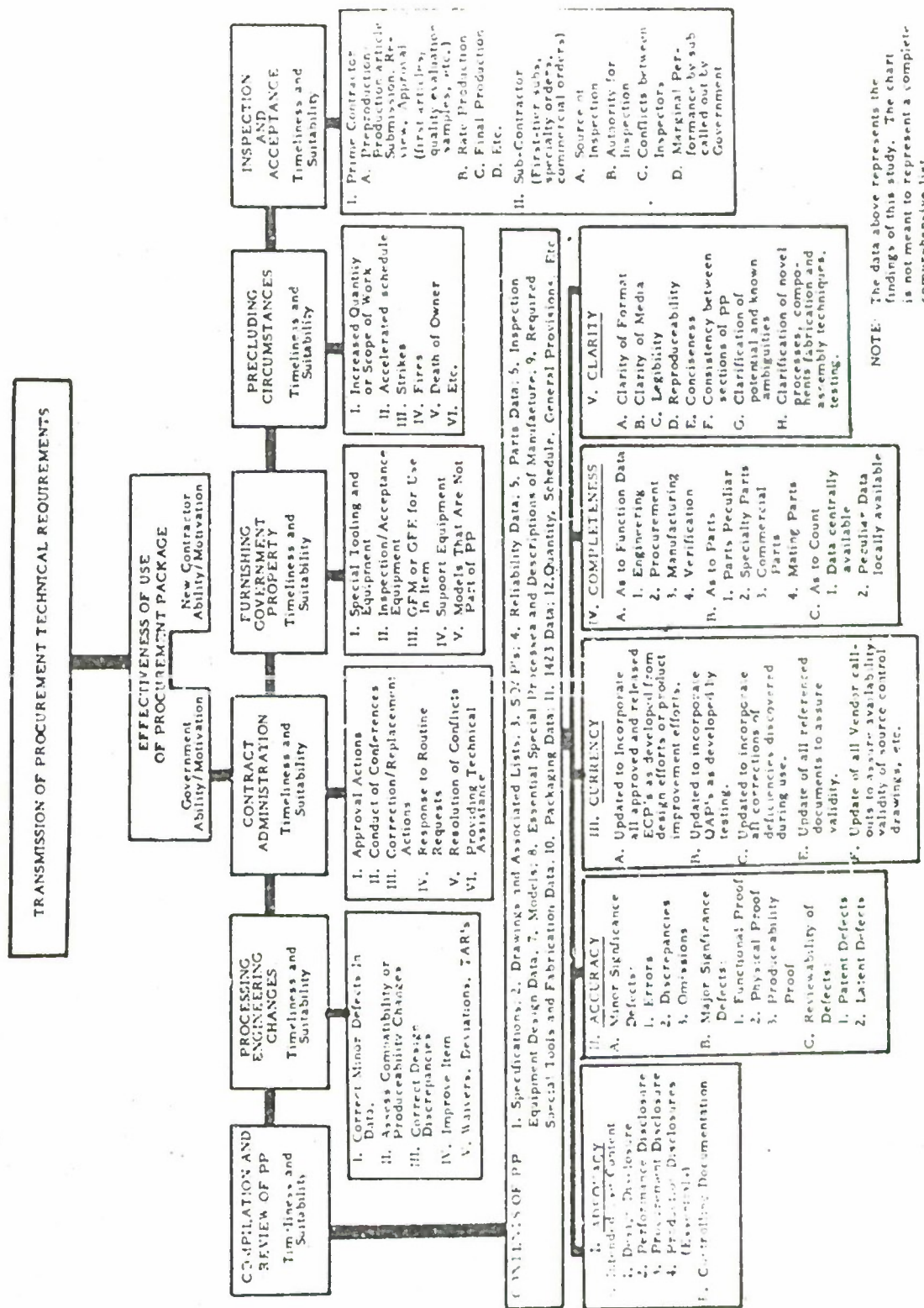


FIGURE 4. Patterns of Confrontations Over Which Involvement and Indispensable Contract Modifications Occur. New Contractor Confronts the Government

was questioned by a confrontation. Many such confrontations were over details requiring some redesign to meet the performance requirements. The PCO would be of the opinion that the required redesign work was minor (even trivial) in nature, applied to only a small part of the overall item, and that "production" per se was the intent of the contract. The N-KR on the other hand, would be of the opinion that the redesign work constituted a major effort, of which he was not aware at the time of estimating and bidding. The contractors often assert that "development" work per se was the primary intent of the contracting officer rather than production. This type of contract often becomes a contest between attorneys and can seldom be considered a successful transmission of PTR's.

Many competitive reprocurments are effected without full and complete technical documentation--yet the TDP can be construed as adequate providing some form of documentation controls the procurement. This is done for a variety of reasons, e.g., circumventing limited rights data, or known defective data. Typically, the controlling document would be a performance specification and a reference model would be provided to aid in constructing the physical characteristics. Such drawings as are available, could also be used as a "reference guide only." A purchase description may also be utilized to take certain exceptions and add other desirable features. The confrontations that occur in such incidents, however, strongly suggest that often the performance specification, the purchase description, and the model conflict. There are misunderstandings as to the intentions under such a contract; such matters are

difficult to reconcile without modifying the contract to absorb the consequences of the misunderstandings.

2. Accuracy.

The pattern of confrontations observed clearly illustrates that the "defects" in the TDP are a major source of unplanned contract modifications. Among the types of defects observed were incorrect dimensions and material specifications, obsolete data, missing dimensions and, of course, design deficiencies. The elimination of defects is a struggle. The process of elimination hinges around inspection and test of previous construction of prototypes, APE models, pilot lots, first articles, and of course, any previous production runs. That is, the inspection and test function serves to eliminate defects and prove-out the data to the hardware and the hardware to the data. Functional and physical configuration audits, equipment verification reviews, and the like, theoretically help eliminate more Engineering Change Proposals (ECP's) for design defects and minor errors than any other known method. After observing a given contract, however, that has been modified drastically as a result of such defects (including both minor errors and design defects) the questions that naturally arise are:

- a. Has an examination of the "as built" configuration of the item to the technical documents ever been conducted?
- b. Has a "shake out" quantity of the subject configuration to reveal hidden design defects ever been produced?
- c. Why do so many minor but significant defects exist when theoretically previous reviews, audits, inspections and test should have eliminated them or at least reduced the quantity?

d. Has a producibility study and validation of producibility to reveal volume production problems ever been conducted to explore hard vs. soft tooling issues, to determine mass production line in-process inspection rates, and so forth?

It would appear that the TDP could be quite "adequate" in spite of such defects providing contingency measures were taken to contract accordingly. But on the surface it would appear that the PCO tends to solicit the open market for competition and enter into a FFP contract as though there would be few if any significant defects in the TDP.

3. Currency.

AMCR 70-46 sets forth that all TDP's will be maintained in an up-to-date condition and that the status of each TDP will be examined prior to each individual procurement action to assure that all revisions have been included. It also points out that it is sometimes necessary to use a TDP "as is" where the design is still in flux and deficiencies are not eliminated.¹ Both lack of "updating" and use of the TDP "as is" were observed to incur consequences that did result in modifications to contracts. As an example, in one "update" confrontation, where the TDP was used in "as is" condition, 350 drawings were replaced approximately 90 days after award. The consequences were therefore negotiated under single source conditions. This seriously jeopardized a major program. The consequences were still being resolved a year and a half later after extensive delinquency had occurred and a claim for extra costs was in process.

¹AMCR 70-46, para 4d, p. 2.

4. Completeness.

Many contracts experience the incidence of missing documents. It appears to be a commonplace event. It can and does have consequences which certainly require replacement of the documents--perhaps by return to the DP-KR with the attendant delay and a modification to the contract.

In addition to the misplaced or missing drawings problem, however, one confrontation illustrated the importance of including interface data; i.e., the item was manufactured quite satisfactorily but there was no way to attach it to a larger system because the interfacing documents and mating parts had been overlooked. In this case, they were never acquired from the developer. An extensive delay followed, two sets of costs were negotiated under adverse single source conditions of urgency, it was necessary to revise and rework the contract packaging aspects, and the overall mission was jeopardized.

5. Clarity.

On the surface, clarity might be viewed as a "nuisance" type issue, one that should be readily recognized and resolved. This type confrontation turned out to be one of the most frustrating and elusive to resolve. For example, in one large dollar contract for a major item, a confrontation occurred over the legibility and reproducibility of approximately 12 documents. It seemed unreal (with "after-the-fact" judgment) to trace the pattern of events that followed. Since this confrontation was not immediately resolved, it started a chain of confrontations that eventually delayed the first delivery 60 days, required a modification to the contract, and created animosity between the parties.

Processing Engineering Changes

Most engineering change activity in first competitive buys seems to be to correct minor but nevertheless significant errors. Next in frequency would be the assessment of changes to facilitate manufacture and assembly by correcting impossible or impracticable conditions. Some, but fewer, Engineering Change Proposals (ECP's) might be necessary to correct design deficiencies or improve the product. Finally, processing deviations, waivers, and various technical action requests is also a "busy" activity.

For the purpose of this study the important point is that such actions as these are a form of confrontation which can and does have consequences of varying significance which frequently does result in a modification to the contract. Some contractors demand price and delivery schedule adjustments through the changes article for each error, ambiguity, or incompatibility encountered in the TDP.

The timeliness and suitability of the change control function is crucial. It directly influences the severity of the consequences. Providing the ECP's, Request for Waivers, etc., are justified, there is seldom a discretionary choice other than to issue approval. Of course, there is always a choice of whether to improve the item, but errors in the TDP and design defects must be corrected. The manner in which they are corrected--and priced--is perhaps equally as significant as the existence of the defects in the first place. If approval is delayed or conflict occurs, it consumes the N-KR's preproduction lead time, delays vendor orders, and compounds costs and other scheduled matters. This type of

confrontation was observed several times; it was noticed that the N-KR's usually "follow-up" such requests frequently, both to expedite approvals and to create a foundation of proof to justify subsequent claims or negotiating positions.

One general observation was that ECP's were often approved in urgency, even though unpriced. They were lumped together and issued as a modification for subsequent price and time negotiation. Unless limits or ceilings were placed on price (and even the time factor) the PCO tended to lose control of the contract parameters. In addition, the visibility of the impact of each ECP became obscured. The whole issue of assessing the cost and schedule impact of waivers, deviations, and ECP's is naturally a very "gray" area anyway. Under such conditions the PCO was at a distinct disadvantage as he attempted to reconcile matters, regain control, and equitably adjust the contract price and schedule. The condition was compounded when several such blocks of unpriced ECP's were approved into the contract prior to "settling up" on previous blocks. The overall time, cost and performance parameters of the contract were temporarily in a state of confusion. Sometimes restructuring was accomplished only when much of the contract work had already been completed.

Administering the Contract

In spite of the opportunity they afford for clarifying PTR's, post award conferences and meetings between the N-KR and the Contracting Officer's technical representative continue to provide a dangerous opportunity for extra-contractual specification of terms and conditions and subsequent misinterpretation of verbal understandings.

Confrontations were observed that occurred, not because the TDP was inadequate, but over the fact that no response was received to routine requests for clarification, minor technical assistance, correction and replacement actions, and for miscellaneous approval or reject decisions. As consequences accumulate, N-KR's eventually resist having to bear the burden of indecision. Sometimes an N-KR will exaggerate the extent of the consequences; occasionally he will even stop work.

"Non-response" seems to be a deliberate technique used by some PCO's when faced with a post award technical requirements dilemma, a decision that can be postponed, or an outright disagreement; i.e., they make no decision at all and wait to see what happens under the existing terms of the contract. In one such confrontation the N-KR held that he was forced to accelerate the schedule by reason that the PCO would not approve or reject his "justifiable" demand for a time extension; accordingly, he completed the first delivery on time and simultaneously submitted a claim for acceleration costs.

Furnishing Government Property

Frequent confrontations did occur over the timeliness and suitability of Government Furnished Property (GFP). This has been a long standing problem common throughout DOD. For example, with regard to unsuitable GFP, in one contract, three types of Acceptance Inspection Equipment (AIE) were involved: gages to be made by the N-KR; gages to be purchased from the DP-KR; and gages to be furnished by the Government. In view of past difficulties in constructing the item, it was determined to be essential to conduct a 100% check of all gages to all drawings and correct discrepancies whether such discrepancies were in the gages or the drawings.

The only discrepancies discovered were in those gages furnished by the Government. Correction of the discrepancies did affect the time parameter of the contract.

More commonly, the confrontations occurred over timeliness such as PCO failures to coordinate availability of the GFP. Thus, he was unable to deliver the GFP at the time promised. Since other schedules were interdependent with GFP dates, untimely or unsuitable property directly created consequences that almost forced a modification to the contract. An important aspect of these confrontations was that the true impact of untimely or unsuitable GFP was difficult to assess; it therefore appeared to serve as a "catch-all" justification for extending a contract schedule when apparently the need for additional time related to other factors. Since the PCO was to blame in part, he tended to absorb the whole of any related consequences.

The use of reference models is a controversial way to specify technical requirements. Yet it is a necessary technique in some procurements and especially in some commodity lines. Accordingly models are frequently furnished as "visual aids only" and are deliberately excluded from the PP per se. Yet it is implied that the "model" is often the most tangible and meaningful description to the N-KR. If the model is inoperable or is "obsolete" in some aspect or contains different vendor parts or if the model was not manufactured to the subject TDP, etc., it is a source of dissention and confrontation. In theory such dissention should not occur; but it did occur in several of the contracts studied. The root of the problem seemed to be that, initially, a complete understanding had not been reached as to the purpose and conditions under which the model was furnished.

Performing Inspection and Acceptance

Very few "first competitive buys" of complex MDE evolve through the points of first article inspection without some type of confrontation. This review involves first articles that are either preproduction or initial production articles, using methods, processes, materials and equipment that are to be used in regular production. This sequential point in the production cycle has three steps: the submission of the first articles, the review to determine their acceptability, and the approval to proceed toward production. Any of these 3 steps are sources of confrontation. If the N-KR doesn't make timely submission, the PCO confronts him. If the first article doesn't pass inspection a confrontation occurs. If the Government delays approval, it may impact upon other schedules, and the N-KR confronts the PCO. Characteristically, in one contract where Quality Evaluation Samples (QES) were required, a delay in approval occurred and the N-KR produced and shipped the item in accordance with his contract, only to find that the QES's were eventually rejected.

The point of first article inspection is a complicated point in time, and an interchange of viewpoints occur. If misunderstandings have prevailed, this is where they come to light and must be resolved. It is imperative that the terms of the contract be clarified by this point in time. If the contractual preproduction lead time was, in fact, unrealistic, an adjustment may be in order. If extenuating circumstances have confounded the difficulties in meeting first article schedules, an assessment of such circumstances may be proper. The PCO often has two

alternative approaches: cooperate with the N-KR to help him construct an acceptable first article; or, adamantly abide by the literal terms of the contract. It may be a matter of attitude. One attitude might be that the position of the Government is precarious, i.e., it may not have provided a wholly "adequate" TDP to permit construction. Therefore, it is ethically bound to bend and flex within reason if the N-KR is "trying hard" and showing satisfactory progress. The alternate attitude might be that the N-KR promised to construct an acceptable first article and his inability to do so constitutes "failure" under the terms of the contract.

Both of the above approaches were observed in this study; both approaches resulted in consequences that eventually required a modification to the contract. Probably the most unpleasant confrontations occur when the parties (with one attitude or another) do not squarely face the issues nor strive to resolve the conflicts. Instead, they separate into two camps and begin to parry for legal position. In such an event, the PCO is at a distinct disadvantage if it can be demonstrated that the TDP is defective in some way, or that the Government in some manner failed to perform as promised. In addition, the procurement mission is in jeopardy. In other words the overall motivation of the parties can be reversed at the point of first article inspection.

A similar line of rationale applies to the first scheduled delivery date for the first quantity of production items. Confrontations were observed over problems relating to source of inspection and authority for

inspection. The latter actually contributed indirectly to the termination of one contract. The prime was unable to construct a critical part of the item and was forced to return to the DP-KR under a sub-contract. In doing so, however, he did not understand, or otherwise failed to transfer authority for inspection--and the DP-KR made no mention of it. The issue was brought to light only after extended delay, and the N-KR apparently had "given up" on the hope of making a profit or that the DP-KR would deliver. Accordingly, the N-KR had stopped progress on the whole of the contract to minimize his loss. A termination resulted.

When a sub-contractor Quality Assurance Representative (QAR), either resident or itinerant, and the prime contractor QAR disagree over the acceptability of a part, the Government may be caught in the middle with the consequences. A similar dilemma was observed where a vendor called out by the Government could not or would not perform for the prime. The question becomes: Who pays for the consequences?

Reacting to Precluding Circumstances

Many confrontations occur when miscellaneous environmental factors somehow inhibit and preclude effective transmission of procurement technical requirements. When such circumstances preclude steady state performance of a contract, it normally has little to do with the adequacy of the TDP or the effectiveness of its use. Such circumstances may be planned and desirable such, as modifications to exercise options, multi-year increments and to increase or decrease line item elements of the overall scope of work. Such circumstances may also be unplanned and

somewhat undesirable. For example, it is necessary occasionally, to accelerate time schedules. Excusable delays and Acts of God do occur. And both parties must react to such precluding circumstances; usually it requires a modification to the contract.

Confrontations Over the Inability of
the New Contractor to Perform:
Government Confronts the New Contractor

As stated in Chapter II, the N-KR per se is one of the primary obstacles to effective communication in the transmission of procurement technical requirements. One of the four fundamental elements of the natural system to accomplish the function of competitive reprocurement of MDE is to select a new contractor by a careful and deliberate determination of his willingness and ability via a "determination of responsibility." Theoretically after award, the N-KR should be able and motivated to perform well--almost in a "steady state" manner. Yet, for various reasons, many N-KR's later become unable or unwilling to perform, notwithstanding the initial determination of responsibility. Certain consequences follow and have to be absorbed or allocated to one or the other of the contractual parties by modifying or terminating the contract in whole or part.

New contractors' contributions to the overall communication problem in transmitting (and receiving) procurement technical requirements were recorded and broken out in the following characteristic patterns: by an inability or unwillingness (it was impossible to distinguish which) to manage the affairs of his contract; to perform with technical competence;

to perform at the rate and schedule specified; to control the performance of his subcontractors; and to perform at the promised price. (See Figure 9)

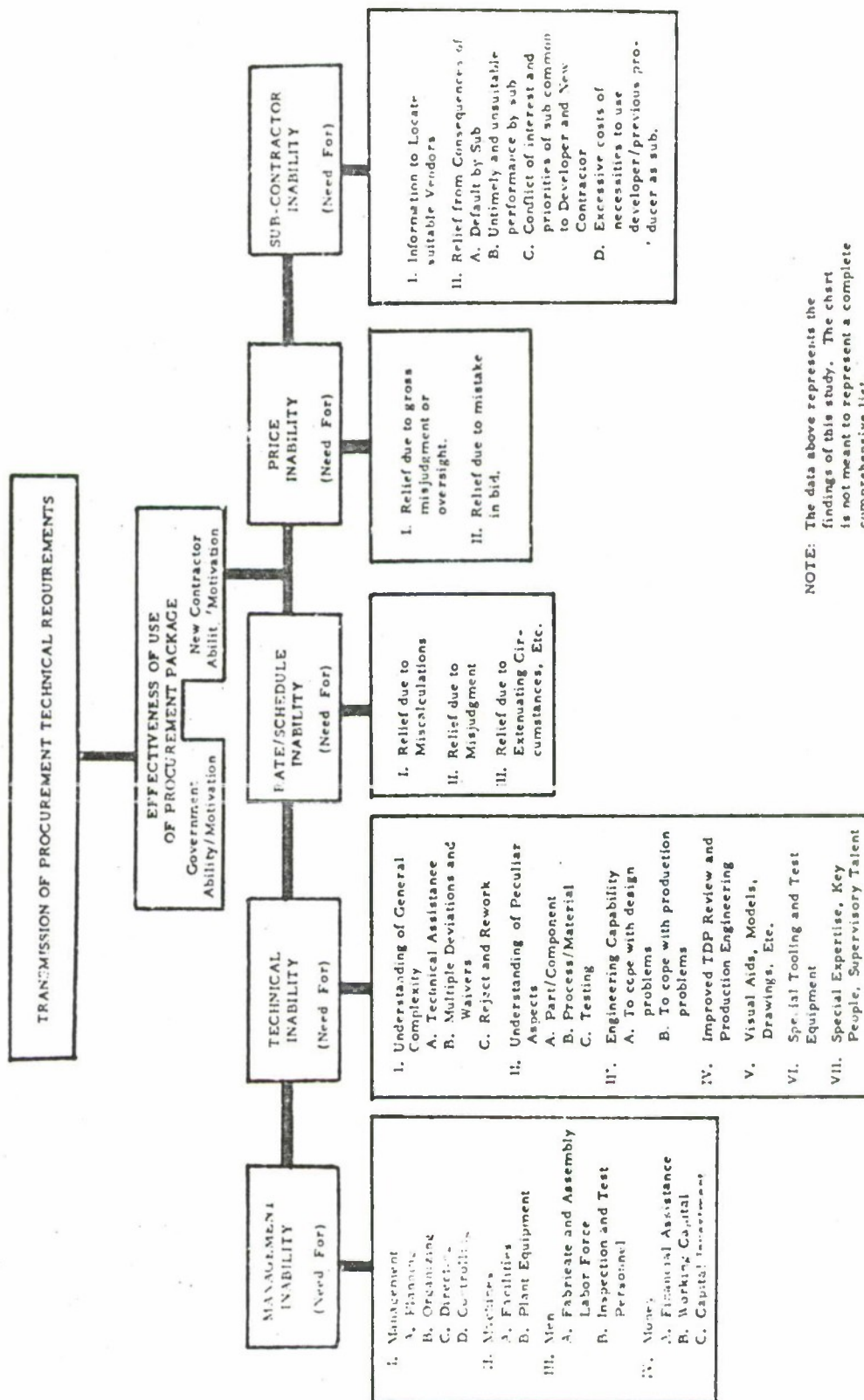
Once again, it is not intended to list and relate each element of data gathered, but several examples with some discussion may serve to clarify the characteristics of the confrontations that did occur and which were observed through after-the-fact investigation.

Management Inability

A contractor's ability to manage the general affairs of his contract is a fundamental requirement. If he does not manage his affairs, it frequently results in a confrontation. This may have a distinct impact on the effectiveness of the transmission of procurement technical requirements.

Several contractors were charged with unsatisfactory progress due to poor planning and scheduling. The confrontations that occurred placed both parties on the defensive--once it became clear that the N-KR needed extra leeway as a consequence and that the PCO was not amenable to absorbing the burdens.

A few first competitive reprocurments of secondary items were performed by contractors operating under Chapter XI of the Bankruptcy Act and the PCO was fortunate to receive such performance as he did--however erratic it may have been. Some N-KR's became bankrupt during contract performance and the sheriff padlocked their doors. It was interesting to note that one N-KR tried right up to the final click of the padlock to perform for the PCO; he was 85% complete in his performance point.



NOTE: The data above represents the findings of this study. The chart is not meant to represent a complete comprehensive list.

FIGURE 9. Patterns and Points of Confrontation Over Which Unplanned and Undesirable Contract Modifications Occur: Government Confronts the New Contractor

His problem was a shortage of working capital as his personnel left him one by one.

A number of capital equipment and tooling problems were observed; the confrontations arose from an attempt to gain access to the equipment and tooling used by the DP-KR or his subcontractors. Sometimes such equipment was not available without a prolonged lead time, or at unrealistic capital investments, or at an impracticable price payable to the DP-KR. It is imperative that such issues be resolved one way or another before award, for when this type of confrontation occurs after award, it may motivate the N-KR to fabricate other kinds of justification for extending the schedule to provide time to work his way out of the dilemma. If it is possible for the N-KR to attack the adequacy of the data package, then taking such action may be perceived as the "least loss" approach.

Technical Inability

Many confrontations were observed wherein the N-KR was apparently grasping for "know-how." The literature contains attempts to define "know-how." Such an effort, however, is beyond the scope of this study-- for it is conceived very differently and depends upon the viewpoint.

As previously discussed, many types of information are not contained in a data package. They are deliberately excluded per the Category E, MIL-D-1000 theory of a full design disclosure package intended for use in reprocurring identical items. There is no intent to provide full production disclosure but only that which is essential. Such exclusions and one viewpoint of their significance are characterized by the following excerpt from a Rand paper on competition in defense procurement which pointed out that:

and were obliged to perform extensive rework even though many deviations and waivers were granted. Occasionally formal technical assistance was obtained indirectly from the DP-KR or provided directly by the Government. A "learning curve" stage was required, for the N-KR's obviously did not know how, even though they bid and received the award.

2. Also evident in some contracts was a lack of understanding as to a particular part or component, process, material or test techniques. In some confrontations the parts were critical to the function of the item, were clearly the pacing part, or were ~~known~~ to be exotic at the time of award. In several cases the N-KR could complete his contract only by returning to the DP-KR for technical assistance via a subcontract. In other words certain production "know-how" was essential to these contractors notwithstanding its non-essentiality to other prospective firms.

3. Some confrontations directly arose from allegations that erroneous (even falsified) design data had been documented in the TDP. When redesign work was not authorized by the PCO, this created a near impossible condition which was either due to technical inability (perhaps a missing increment of "know-how") or an inadequate TDP. Such issues take time and money to resolve and the contract parameters must be modified appropriately.

4. Several confrontations center around whether or not the defects were reasonably apparent upon review, whether or not the N-KR's should have conducted a better review for defects in the TDP, and whether or not they should have "spoken up" before "cutting iron." If the N-KR starts producing hardware before he "speaks up" about defects there may be severe differences of opinion as to who should pay for the consequences. In one

view these were amateurish actions; in the other view these were costly and unfair specifications. In any view each confrontation had unfortunate consequences.

5. Many confrontations were over a need for additional visual aids, models for teardown purposes, indirectly-related drawings and mating parts. Sometimes the requests were granted; other times it was not practicable.

6. Confrontations occurred over special tools and equipment--other than capital equipment--which was construed as a form of technical inability for which the N-KR was solely responsible. Examples of such confrontations included tool failure, equipment breakdown, and conditions where planned tooling was not suitable for the purpose intended.

7. Several contracts were awarded, in part, on the basis of key personnel in the contractor's employ; i.e., special expertise was known to be required, and the PCO was under an erroneous assumption that it was available to the N-KR. This condition placed the contracts in jeopardy, often involving extensive delinquencies and other dire consequences, some of which resulted in a restructuring of the contract.

Rate Inability

Many confrontations were observed where the N-KR simply was not able to meet the rate of production specified or a given schedule data. In these instances, there were no allegations that the data package was inadequate, defective, or that the Government was to blame in any way. They apparently stemmed from a miscalculation or a misjudgment, on the part of both the N-KR and the PCO. It may be debated that the rates or

schedules were unrealistic in the first place, but that issue is academic after the contract has been consummated. The issue after the fact is whether or not to modify the contract and how to apportion the consequences.

For example, in one confrontation, prior to extending the time schedule and reducing the specified rate, apparently the PCO considered the alternatives to be very limited--either terminate in part, require the N-KR to subcontract with the DP-KR (or another source) for the residual rate, or cause the Government to absorb some of the consequences. After investigation it was learned that the problem area related to a misjudgment of an on-line inspection rate for a pacing part. The best estimate of the cost consequences was that the N-KR would lose perhaps \$40,000 to \$50,000 monthly until production was complete, even after the rate and schedule had been reduced by modification to the contract.

In another similar example, this sort of loss was observed to be the basis for a request for extraordinary contractual relief under PL 85-804.

Price Inability

A type of confrontation similar to "rate inability" was observed when N-KR's discovered after award that either a mistake in bid had been made, or a gross misjudgment had occurred in estimating. Either they had overlooked an area of work or had underestimated the level and type of effort required. It is very awkward to handle such confrontations. Most often there is little that the PCO can do except to consider all the facts and the law, as sympathetically as possible, and to beware of the possibilities of negative motivation.

Sub-Contractor Inability

Confrontations were observed where N-KR's needed procurement support data to locate suitable vendors and to enable them to assure the quality of the vendor's specialty parts, materials and services.

Frequently, subcontractors were in default or were otherwise unable to perform in a timely and suitable manner. A rejection by the prime contractor of defective sub-contracted parts directly affects the status of the prime under the terms of his contract with the Government. It is often in the best interests of the Government to either absorb or share in such consequences and to modify the contract accordingly.

Two confrontations occurred over sub-contractor problems that developed because the same sub-contractor was (necessarily) common to both the DP-KR and the N-KR. The common sub either was operating at full capacity for the DP-KR or for some reason would not honor the order from the N-KR. There have been allegations that some such sub-contractors have special agreements with the DP-KR's which prohibit them from selling to the Government through firms other than the DP-KR.¹ However, this was not directly observed in this study.

Confrontations were observed several times where the N-KR worked closely with the DP-KR or a previous sub of the DP-KR to perform the contract. This was done out of necessity in some contracts, for the contracting officer insisted upon performance, and the contractor did not have any other reasonable alternative. It was also done, (apparently) because the relationship was most favorable for both the N-KR and the

¹ASPR Committee Case No. 68-214, proposed ASPR 9-203(f) Clause

DP-KR. That is, the DP-KR had minimal startup expenses; he had experience, the knowledge and skills, along with tooling and equipment; perhaps the DP-KR even had excess items, parts or materials on hand.¹

¹In such cases there was rarely a need for modifying the contract with the N-KR. In fact, such contracts were conspicuous by the absence of unplanned modifications.

CHAPTER IV

THE CHARACTERISTICS OF THE VARIOUS DEVICES EMPLOYED TO DEAL WITH THE CONFRONTATIONS

Introductory Discussion

Certain practices, techniques, policy and procedural guidance, and even attitudes, have evolved to aid in transmitting procurement technical requirements in early competitive reprocurments. The overall effort is more than a recognition that a problem exists. It is an attempt to preclude and prevent the kinds of confrontations previously identified and to remedy and reduce the consequential impact. In overview, they are communication aids and/or "devices" created to overcome the natural technological communication barrier.

The purpose of this section is to identify the general categories and characteristic patterns of such devices and to briefly consider their effectiveness. In keeping with this concept, it may be useful to consider the approaches along a spectrum of precautionary techniques. At one end procure single source and not risk competition. On the other end, after risking competition, resolve the consequences of a confrontation by following the literal terms of each contract, however such terms may be set forth. Short of these extremes, however, numerous devices are being employed: (1) to be initially cautious about entering into a contract (precluding devices); (2) to be cautious about soliciting and arranging the terms of the contract (preventative devices); and (3) to administer the contract after award with extra surveillance and concern (remedial

devices). The patterns of the devices observed include but surely are not limited to the following: (See Figure 10.)

Precluding Devices: Presolicitation Precautions

After determining to risk competitive reprocurement, considerable precaution may be taken before issuing an "open market" solicitation. Major Subordinate Commands (MSC's), where applicable, have taken the following actions:

1. Test the first competitive buy among limited sources only--i.e., the competition may be limited to firms whose management and technical qualifications are rated high with price considered as an evaluation criteria of lower significance.
2. Place an "educational" order or contract for a limited production quantity with one or a few firms to generate a meaningful competitive base.
3. Perform a presolicitation in-house review to search for and detect incompatibilities, apparent errors, gross defects, and the like in the hope that some defects can be eliminated and "essential" aspects clarified.
4. Engage a third party contract to review the data package in-depth. This may or may not include fabrication and assembly of actual hardware.
5. Conduct extraordinary tolerance studies in-house or by contract to analyze the interaction of certain parts and to detect potential problems.

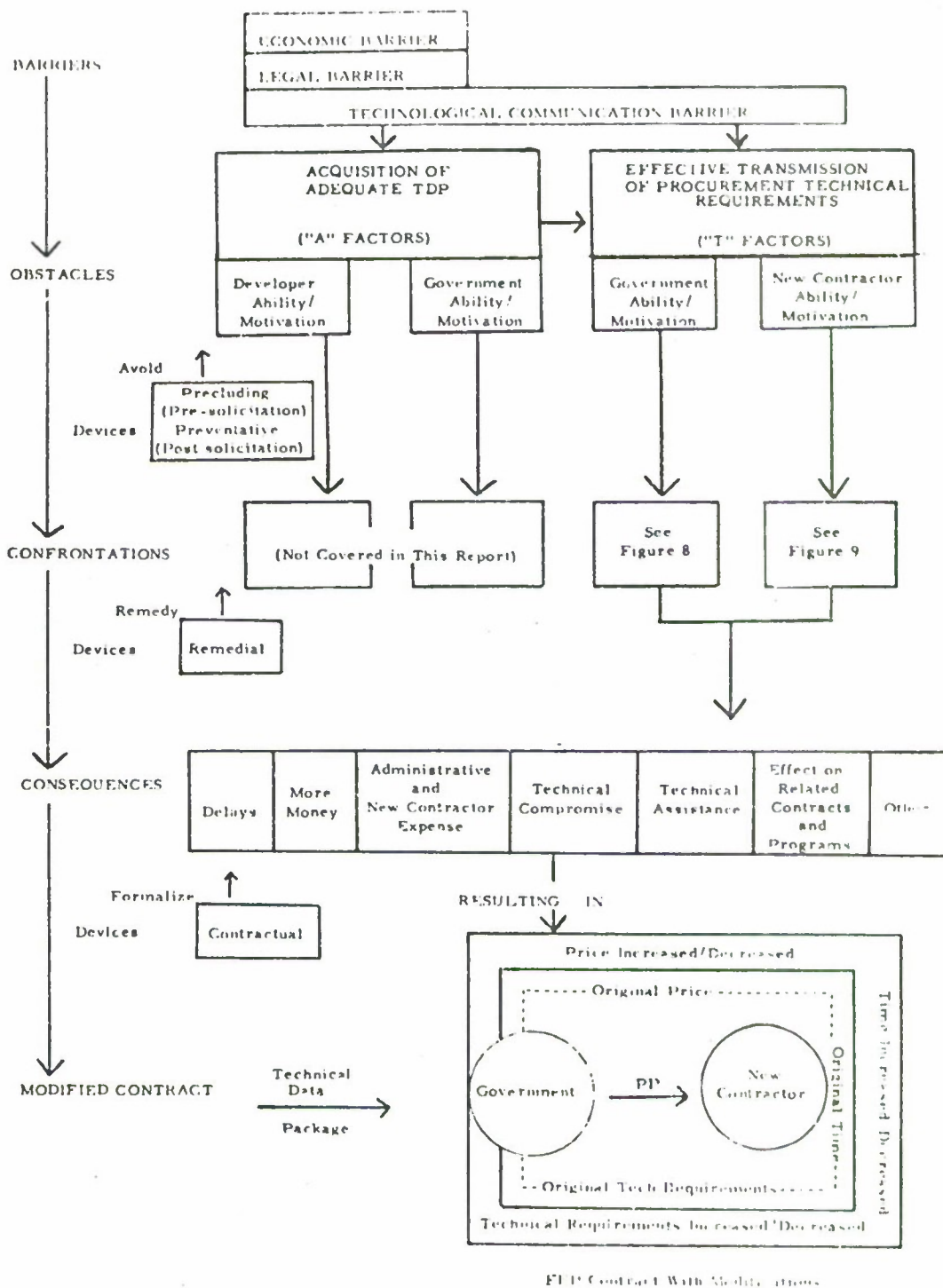


FIGURE 10. Problem Complete - Introduction of Procurement Dispute

6. Conduct extraordinary producibility studies on one or a few pacing parts to anticipate volume production problems; this type of effort has limited results and often cannot be "firmed up" until the given production approach of the new contractor is known.

7. Conduct extraordinary process engineering studies to determine realistic, maximum and minimum lead times, rates and schedules to be required under the solicitation and resulting contract. Coordinate this effort with NICP (National Inventory Control Point) requirements and customer due dates.

8. Conduct in-depth interchange with the developer of the documentation to assure that he stands behind the data, to resolve any final matters, and to elicit his advice. A "warranty" of the technical data may be involved and also a certification as to its adequacy for competitive reprocurement. (Attempts have also been made to commit the developer to a share of the risks of subsequent "damages" arising from defective data.)

9. Conduct a 100% review of all acceptance/inspection equipment for verification suitability. A developer's warranty may also cover AIE and related equipment.

10. Delay release of the TDP (urgency notwithstanding) until all inprocess approved and released Quality Assurance Provisions and ECP's have been received and posted. A formal verification to this effect has been required in attempt to avoid "planned update" confrontations after award, which can cause a restructuring of a contract under single source environment.¹

¹AMCR 70-46, pp. 5-6.

11. Plan for and coordinate acquisition, suitability, and "certified" availability of all appropriate special tooling and test equipment which may be necessary and useful to the prospective N-KR. This would include any model to be provided and any GFM or GFE to be incorporated into the configuration end item.

12. Conduct an Independent Government Cost Estimate (IGE), to establish a pricing base for comparison with prospective competitive prices to facilitate analysis of potential mistakes in bid, impossibly low or unreasonably high prices.

13. Conduct in-depth procurement strategy conferences to elicit the advice of all affected specialists and managers, to analyze the content of doubts and suggestions, to trade-off between alternatives and priorities, and to otherwise measure the risks of competitive reprocurement.

14. **Deliberately** establish a plan and organizational arrangement to expeditiously and effectively process and control engineering changes. This often includes extraordinary configuration management techniques. The plan may include arranging by an engineering service contract with the DP-KR or systems contractor for assistance in controlling the changes. It also may involve such things as utilization of telecopier techniques to assure almost instant turnaround time.

15. Evaluate the applicability and practicability of utilizing a variation of the Preproduction Evaluation Contract Concept (PPE).¹ In a PPE contract the N-KR is required to conduct a review of the TDP and thereafter certify its suitability for his use in complying with all

¹US Army, AMCP 715-6, Preproduction Evaluation Contracts, May 1970.

end item performance requirements. The distinctive feature is that certain "compatibility" changes must be accepted by the contractor without additional costs to the Government and without delay in the delivery schedule.

16. Anticipate and prepare to provide such technical assistance as may be appropriate and required by the N-KR during the prospective procurement. This may range from guidance provided by a simple telephone call to very formal arrangements for extraordinary assistance.¹ It may directly or indirectly enlist cooperation from the DP-KR.² Certainly, an important part of this preparation is to assure, one way or another, that technical assistance is rendered effectively if rendered at all. (See Figure 11, Technical Assistance.)

Preventative Devices: Precautions During Solicitation and Award

In addition to the precautions cited above, considerable precaution may also be taken in soliciting prospective offerors, in selecting the contractor, and in arranging the terms of the contract. Contracting officers, where applicable, employed the following techniques and devices:

¹The ASPR (as an extraordinary technique) provides for a Leader Company Arrangement to furnish manufacturing assistance to a follower company to enable it to become a source of supply. (ASPR 4-701.)

²Enlisting cooperation from a DP-KR is frequently awkward and impracticable since the two contractors involved are competitors. On the other hand many systems contractors, developers, and other previous producers are quite cooperative and are concerned about the overall success of a given program. If not directly in the instant case, then at least indirectly, such contractors stand to benefit by the success of the program.

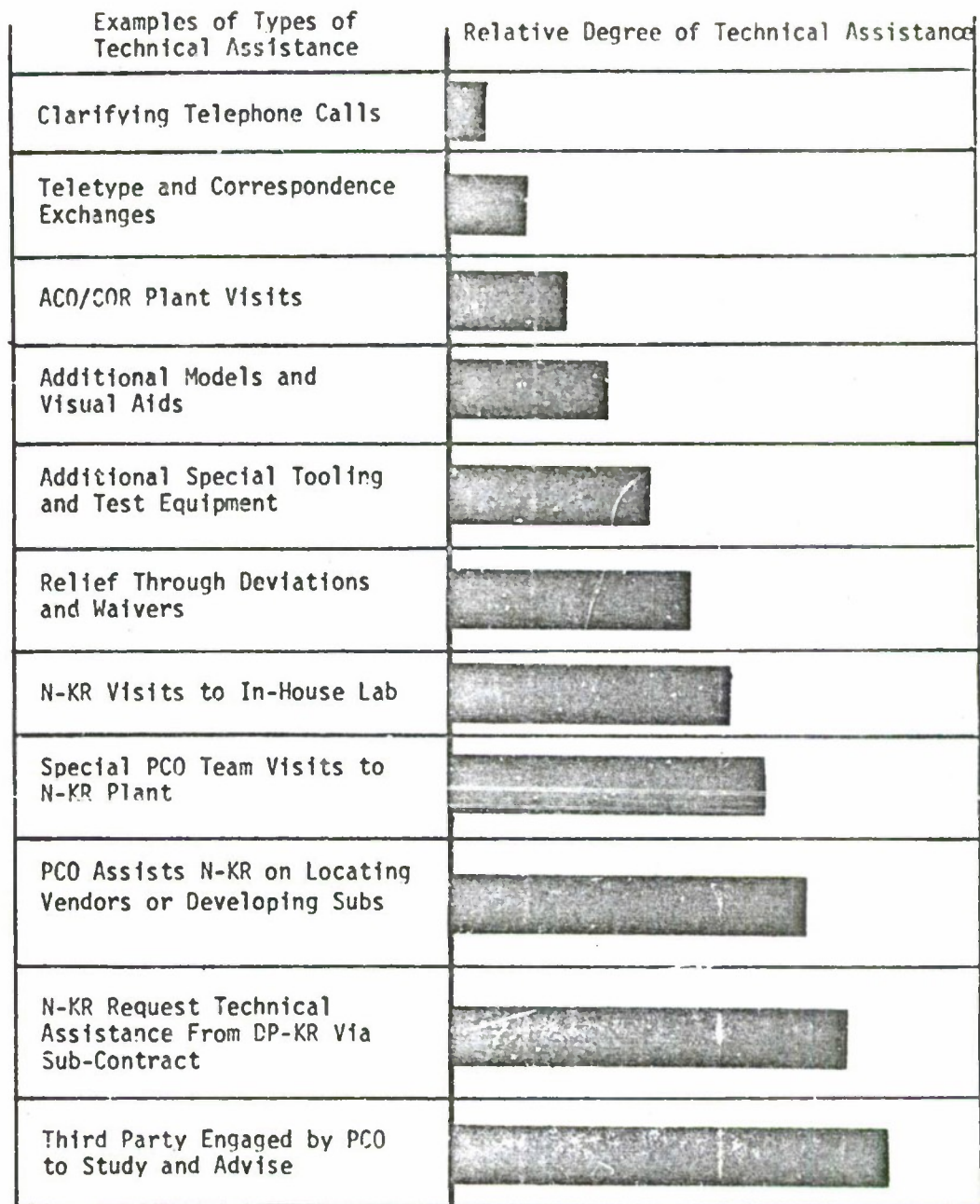


FIGURE 11. Technical Assistance

1. Challenge certain aspects of the TDP such as:

a. Excessive and abusive use of a "purchase description" technique to be placed within the contract schedule. This technique is used to take exceptions and to make additions to the coordinated drawings and specifications. Such excesses and abuses, however, can garble the controlling documentation and create inconsistencies and ambiguities which cause downstream confrontations during contract performance.

b. Completeness and legibility aspects. The PCO may require an extra measure in this effort to assure a fair and equitable basis for the competition.

c. Actual suitability and availability of GFP. This may be challenged at any time up to the moment preceding award.

d. Actual production intent of contract vis-a-vis developmental work that may incidentally be a part of the procurement.

2. Challenge certain aspects of the procurement work directive such as the realism of rates, schedules, and corresponding leadtimes in specific relationship to the PTR's.

3. Exercise special precaution in establishing the controlling documentation of the contract if the procurement action is likely to involve:

- a. limited rights data subject to challenge;
- b. grossly obsolete, erroneous or defective data;
- c. data that has been disclaimed (as in the PPE Concept);
- d. requirements for developmental effort;

e. data that requires reference to a model to perform under the contract: (e.g., reverse engineering)

f. Other potential conflicts between the performance specifications and the drawings. (If a performance specification is to govern, establish the purpose and conditions under which any drawings, models and associated technical data are to be furnished and used.)

4. Negotiate, or use a 2-step IFB technique, rather than formally advertise to gain price leverage and in so doing, lose some essential flexibility in the selection of a contractor.

5. Require pertinent historical information and include on the bidders list important sub-contractors of the DP-KR or past producers of similar items.

6. Require detailed information as to any ASPR 1-903 "special" standards that may be applicable to determine the responsibility of a prospective contractor. Include such special standards in the solicitation as a notice to all competitors.

7. Refuse to rush the procurement in the critical stages of solicitation and award, except in justified emergencies. Provide ample "on-the-street" time to permit:

a. effective dissemination of the procurement technical requirements;

b. effective management and specialized reviews of the procurement package by prospective competitors;

c. effective preliminary design and QA analysis, production engineering and vendor contacts.

d. effective estimating, bid preparation, and submission. Still further, be liberal rather than conservative in complying with justifiable requests for extensions of the opening date. Insist that all affected managers recognize that mistakes and oversights at this stage of the procurement can negate or render "ineffective" all upstream efforts and jeopardize downstream objectives.

8. Conduct presolicitation conferences to invite, inform, and encourage widespread competition and to clarify the salient and especially peculiar aspects of the procurement.

9. Listen with an attentive ear, while the solicitation is on-the-street, to comments and suggestions from the DP-KR, the contractor responsible for systems integration, and to other concerned parties offering potentially constructive advice. The Government is especially vulnerable at this crucial stage in the procurement and might well be receptive to screening such advice against existing rationale.

10. Challenge even marginally dubious prices, for a potential mistake in bid. There is little to be gained and much to be lost by awarding to a contractor caught with a mistake in his estimate. If a mistake is not claimed, and doubts persist or differences between the offered price and the independent Government estimate cannot be reconciled, a special facility survey may be conducted to discern whether the offeror can, in fact, perform for the promised price. It is important to pursue and assess the possibilities that the offeror is "buying in" on the price or timeline so that his offer can be rejected (if otherwise practicable) or that any resulting contract with him can be administered accordingly.

11. Perform an in-depth pre-award survey, with PCO representation on the DCAS pre-award monitor's team. Especially evaluate and assess factors cited in the special standards of responsibility listing. If necessary and appropriate, conduct a special capability study in one or several particular areas such as technical expertise or financial capability. In vital or critical procurements an appeal may even be made to the Board of Directors of the prospective contractor for amicable relationships and cooperation in the performance of the contract.

12. If the solicitation fails, perform thorough investigation to find out why it failed and take corrective action to resolicit effectively. If appropriate, recognize the lack of competitive potential and effect a single or limited source solicitation.

Remedial Devices: Post Award Precautions

Additionally, the same spirit of caution may also be followed during administration of contracts. Contracting officers, where applicable, have employed the following techniques and devices:

1. Transmit any final documents, models and missing data to the N-KR immediately after award and formally require the N-KR to certify, within a brief timespan, that he has received a PP that is complete, legible and reproducible. This action requires concerted attention upon this almost clerical matter, yet it reduces the chance and consequence of subsequent confrontations over these aspects.

2. Arrange for and conduct one or several post award conferences at the contractor's facility to assure that he clearly comprehends the gravity and complexity of the procurement, the content of the technical data, the contractual position of the Government, and that he is preparing for satisfactory contract performance.

3. Establish extraordinary technical liaison with the DCAS Administrator Contracting Officer for surveillance of the contract, product assurance planning and preparation, engineering change processing and control, and necessary technical assistance. This may involve temporary organizational arrangements where the ACO hosts a technical member or team representing the PCO. Such arrangements provide geographic ease of access to the N-KR's plant and facilitates processing time and effectiveness of post award communication.

4. Assign priorities and implement an "intensive management" plan to be responsive, to expedite matters, to follow-up, and to coordinate status reporting. In addition, this plan may insure that "exception" data and confrontation data rises to a higher level of management for analysis and decision.

5. Resist or even refuse, urgency notwithstanding, to order engineering changes to the contract without the benefit of pricing estimates, negotiated agreements as to price and schedule impact, or at least a price ceiling and perhaps time limits. Budgetary estimates, for funding purposes, are an important consideration in this issue; more importantly, however, is the untenable negotiation position that is created as a result of issuing unpriced change orders.

While numerous other potential devices could be developed and used by the contracting agencies to increase the effectiveness of the transmission process, those described above were observed most frequently. The following chapter will analyze the size and significance of the problems to which these sets of actions were addressed.

CHAPTER V

ANALYSIS OF THE SIZE AND SIGNIFICANCE OF THE PROBLEM IN TRANSMITTING PROCUREMENT TECHNICAL REQUIREMENTS

Introductory Discussion

After studying 100 contracts it appears that two of the reasons for the complexity of the system of procuring MDE are the level of effort itself and the sophisticated procurement technology that is employed to prevent and control the problem under investigation in this study. To put it another way, there are many people trying very hard to use the most modern procurement methods devised to competitively procure peculiarly designed military supplies in such a way that savings and additional sources of supply are attained. Certainly any high incidence of unplanned and undesirable modifications to "first competitive buy" contracts is not due to a lack of effort or techniques to control matters.

Size and Significance of the Problem

While specific values cannot be cited, enough meaningful observations were attained to provide an intuitive "feel" as to the size and impact of the problem.¹

¹Note: Precise calculations of the size and significance of the problem were an effort beyond the scope of the study. See delimited factors of Chapter I, pages 10 through 13.

In the 100 contracts studied, there were more than 250 modifications that were assessed as being unplanned and undesirable. Since it is not possible to anticipate the frequency and magnitude of such fluctuations in the cost and schedule parameters of a given contract, the occurrence thereof does in fact affect management and operational planning, budgeting, scheduling, etc. Many managers have learned to "live" with this knowledge and accordingly try to adjust their plans, budgets, schedules, and objectives prior to soliciting competitively. They seldom expect the contract to work out as it is initially structured. And while it would seem this hedging is unnecessary, it was found that even in spite of these extra precautions, some procurement missions either were in jeopardy, or did in fact fail.

It should not be inferred, however, that the overall pattern was unsuccessful. Quite the converse was observed. The predominant pattern was that most contracts did result in the delivery of quality hardware without excessive delay in delivery. Furthermore, the increase in cost incurred over and above the competitive award price was relatively small.

The intuitive "feel" as to the size and impact of the problem might also be stated as specific replies to pertinent hypothetical questions.

Given a requirement for a quantity reprocurement action and a design disclosure package of technical data determined to be adequate for competitive reprocurement--even though it may have been previously procured under single source conditions--have procuring activities effectively utilized the TDP to transmit the procurement technical requirements to the right parties under the right conditions so that:

1. The applicable management and operational planning is relatively controlled and carried out as planned so that commodity oriented mission objectives are attained?
2. The economies initially achieved through the competition are retained relatively intact?
3. An effective alternate or additional source of supply is created?
4. The basis for source selection is validated?
5. The feasibility of procuring competitively is demonstrated and thereby ratified as a sound risk?

Answer to the First Hypothetical Question: Was Management and Operational Planning Relatively Controlled and Carried Out As Planned So That Commodity Oriented Mission Objectives Were Attained?

Unplanned and undesirable modifications do occur in competitive procurements of MDE and do affect management control and operational planning. In the study of 100 relevant contracts it was a surprise to find a contract that did not have at least one unplanned and undesirable modification during contract performance. Even in those few instances, a closer examination revealed either that the N-KR was a previous sub-contractor of the DP-KR or that the item/part was not particularly complex. A study of another 100 contracts would likely yield the same results. The "ideal steady state" does not appear to prevail in "first competitive buys"-- ergo the problem does exist.

The impact is minimal if procurement people are able to and adept at hedging their plans, schedules and budgets, which most often they manage to accomplish. The impact is critical, however, if adverse circumstances exceed the built-in adjustments.

Answer to the Second Hypothetical Question: Were the Economies Initially Achieved Through Competition Retained Relatively Intact?

The economic savings initially achieved through competition are most readily visible and measurable as the difference in price between that which was paid under single source conditions and that which was paid under competitive conditions for a like unit of equipment purchased in similar quantities. Such differences do not, of course, equate to pure savings because of the direct and indirect costs incident to generating competition, and other factors, such as time, must also be considered. The proportionate differences, however, are typically great. For example, the following comparative prices were observed:

<u>Item/Part</u>	<u>Previous Unit Price</u>	<u>Competitive Unit Price</u>
a	125.49	76.60
b	85.00	36.40
c	67.66	15.34
d	195.00	139.00
e	6,700.00	2,050.00
f	1.24	0.6487
g	4.97	2.54
h	126.44	88.00
i	229.00	166.00
j	1,300.00	775.00
k	11,530.00	3,400.00
l	207.00	77.80
m	1,095.00	461.00
n	5,037.00	2,670.00
o	4,584.00	1,983.00
p	4,225.00	1,440.00
q	412.59	99.80
r	937.00	487.00
s	12,865.00	8,278.00
t	937.16	486.98
u	192.00	115.00
v	2,450.00	1,528.00
w	487.00	307.00
x	448.00	234.00
y	490.00	277.00
z	115.00	73.00

Not all competitive reprocurements observed resulted in such obvious savings and some resulted in a small price increase. But the overall pattern was impressive: 78 obviously had significant economic savings; 18 did not appear to have resulted in savings and 4 were questionable. There was clearly a great deal of money saved initially by procuring the subject block of 100 contracts competitively.

In view of all the observed confrontations, consequences, and modifications only a few, perhaps 5% to 10%, of the contracts experienced cost growth due to unplanned and undesirable modifications to an extent that consumed or exceeded the initial savings. Most contracts had very little, if any, net increase in the price parameter.

In retrospect, it is difficult to conceive how the set of most "normal" competitive reprocurements could be modified on the cost line to such an extent as to consume all the savings that are "normally" achieved through competition. In individual procurements, some essential factors can be grossly erroneous or some gross set of conditions can occur after award. But the system, the people involved, and the techniques employed all operate to preclude such occurrences in most procurements.

Any critical observer, however, could justly cite the fact that a lot of competitive savings are offset by cost incurring modifications in "first competitive buys." Still further, it could be charged that a few reprocurements eventually cost more via competition than if procured from the previous source--in spite of the initial savings.

Answer to the Third Hypothetical Question: Were Effective Alternate Or Additional Sources of Supply Created?

The answer to this question was clear. Seventy-eight (78) firms manufactured and delivered, items or parts of MDE that had never been produced by other than the developer-previous producer. Inspectors accepted the hardware and the Government paid its obligation. More than that, however, the next time these items or parts are to be repro-cured, at least two firms for each item or part will likely be willing and able to compete for the business, and the Government will not be dependent upon a single source of supply.

Fifteen (15) procurement actions did not result in the creation of a new source, and in seven (7) actions the subject was questionable. Either a subcontractor of the DP-KR received the award, or the N-KR could not produce the item without returning to the DP-KR, or the N-KR did not or was not likely to produce an acceptable item.

In the contracts observed it was not a primary purpose to develop an additional source for each item or part. If the set of DP-KR's and their key sub-contractors had competed more keenly, it is conceivable that all 100 contracts might have been awarded to them. The possibility that they did have lower start-up costs and less of learning curve cost did not enable or motivate them to win the award under "open market" competition. If the theory holds that the fair and reasonable price is that which is determined by "open market" competition, price and other factors considered, then the mere threat and stimulus of competition was not enough to induce the DP-KR's to meet or beat that price.

There are reasons why the DP-KR's competitive offer may not be "low" among the competitive price range; in many competitive procurements he may not even submit a price. For example, any critical observer could cite several specific cases where the award price was subsequently determined to be unrealistic--a fact which the DP-KR probably knew at the time of award. Thus, a new source was only created at subsequent additional expense to the Government or at subsequent loss to the contractor.

Answer to the Fourth Hypothetical Question: Was the Basis for Source Selection Validated?

The answer to this question hinges upon four sub-questions relating to general responsibility, promises as to quality of product, promises as to the time schedule and promises as to price. The questions were asked before award by each respective PCO: Could the N-KR and would the N-KR keep his promises? Could and would he deliver an acceptable product as promised at the time promised at the price promised? It is presumed that the answers were affirmative and therefore became the basis for the award.

The questions were also asked during the course of this study, with the benefit of after-the-fact information. And one thing is certain: it is almost as difficult to answer those questions after-the-fact as it was before-the-fact. The reason relates to the confrontations that were observed. They raise an additional question--"What were the set of promises at the time of award?" For example, did the N-KR promise to deliver

in spite of the fact the 12 drawings turned out to be illegible? That is the question to which the answer is not clear. In some contracts, the questions "could he" and "would he perform as promised?", were subjectively assessed "yes" and "yes" respectively; in other contracts "no" and "no" respectively; in still others "yes" and "no" and vice versa. At this point, it became apparent that the whole issue of validity of source selection was very unclear.

Examples of conflicts between promises and the basis for the promises were commonly observed throughout the contracts studied. They occurred over errors and inaccuracies; missing drawings; ambiguous controlling documentation; obsolete data; untimely and unsuitable GFP, contract administration, engineering change control, and inspection/acceptance; and, of course, contractor inability and motivation. What was the set of promises being challenged in each confrontation? What was the basis for award? Would the promises hold if the N-KR was simply unable to produce 90 units a month? Would they hold if the Government simply could not respond timely to an urgent request by the N-KR?

Was the basis for award validated or invalidated? In an estimated 25% to 50% of the contracts, the unit price increased during performance of the contract; in some cases, it exceeded the third, fourth or even fifth otherwise low offeror/bidder. Were the N-KR's getting well as a result of a "buy in?" Did the Government improperly award the contract without a valid basis--since the low price did not stay low? The answer is not at all evident.

It was observed that 81 contractors (some new and some previous suppliers) did deliver acceptable hardware; 9 contracts did not deliver acceptable hardware; and 10 contracts were still in a questionable state. It would appear that at least 8 out of 10 contractors actually were able and motivated to deliver acceptable hardware. However, it was observed that only eighteen (18) out of the 100 contracts were performed without unplanned and undesirable adjustment to the time schedule (though major delinquencies were few). Were eighty-two (82) contractors "buying in" on the time line? Was the Government remiss in not knowing that they could not or would not keep their promises? Should the Government have denied the award to those 82 firms since other firms might well have been willing and able to meet the required schedule? The answer to these questions is simply not clear. There is no way to be sure what conditions were requisite to the requirement for timely delivery and the reciprocal promise to deliver on time.

It could be said that:

1. Many, if not most, first competitive buys are not delivered in the time frame initially promised; thus, there is little or no validity to the system of awarding as though the contractor could and would make timely deliver.
2. Price was definitely not a valid basis for selecting a contractor in certain contracts. Furthermore, it could be alleged price alone is seldom a valid criteria, since the time line slips in most cases and, directly or indirectly, delays cost money.

3. In certain contracts, the selected source was not able, or did not intend, to deliver an acceptable product.

These points at best, however, are debatable.

Answer to the Fifth Hypothetical Question: Was the Decision to Compete Ratified as a Feasible Risk?

The decision to seek the economic benefits of competition is mainly a function of risk. Measuring risk of a given first competitive buy, however, usually depends upon an ability to predict the outcome. Some degree of confrontation tends to be expected, as stated previously; and, the decision-makers may pad their budgets and schedules accordingly. But the frequency and severity of the specific confrontations that occurred were usually unpredictable. In the 100 contracts studied, it would have been most difficult to predict which action would succeed and which would be fraught with extensive delays and requirements for additional funding, or even fail.

In certain procurements a greater degree of adversity was probably expected than in other cases, as when the level of complexity was very high, the TDP was known to be somewhat defective, or when the item had a history of difficulty evolving through development and initial production. But even then the frequency and severity of the confrontations often appeared to exceed expectations.

Over all the 100 contracts, the majority experienced generally favorable results and the decision to compete was thereby ratified as a feasible risk. For example, from an original delivery schedule of 180 days, one procurement action was delayed 60 additional days and the cost to the Government

increased approximately 15% after award. This was not atypical, and if the mission managers could tolerate the extra costs and time, then the general results could be considered satisfactory. Substantial net economic savings were achieved by competing the procurement.

But more than a few actions could not have been labeled successful and therefore in those cases the feasibility of the decision to compete was not ratified. The resulting damages to the overall program seemed to be out of proportion to any economic savings that may have been initially estimated--especially in some "mission critical" reprocurments.

In either case, whether the results were generally favorable or obviously damaging to the ongoing hardware program, it is difficult to understand how the feasibility of any given original decision to compete could have been measurable within a reasonable level of confidence.

A Synthesis as to the Size and Significance of the Problem

It can now be asserted that a problem does exist and that it does loom significantly large. Almost all first competitive buys result in some unplanned and undesirable modifications. There are distinct risks that any given procurement action may fail or experience extensive delays. It may also require additional funding to cover both in-contract and out-of-contract costs. The problem affects mission objectives; not a small portion of the competitive savings are diluted; additional sources are usually created but often only at unplanned and undesirable expense to either the Government or the contractor; the validity of the basis for source selection is most controversial; and it is often not possible to

predict and measure the outcome with reasonable assurance if a competitive procurement mode is selected.

The next chapter will treat the fundamental causal factors of the confrontations experienced, and attempt to identify the salient aspects of the real problem.

CHAPTER VI

ANALYSIS OF GENERAL CAUSAL PATTERNS THAT TEND TO CREATE THE CONFRONTATIONS AND RESULTING CONTRACT MODIFICATIONS

Introductory Discussion

What are the fundamental causes of the high frequency of contract modifications related to the transmission of PTR's? Are those who cite "A-Factors" correct in alleging that the root of the problem lies in acquisition of an adequate technical data package?--or, are those citing "T-Factors" correct in alleging that the adequate TDP's are not being transmitted effectively?

The Importance of Proper Transmission

Certainly, both views are correct to a degree. Both inadequate descriptions in the TDP's and ineffective transmissions of the total technical requirements contribute to the problem. But the observations of this study distinctly indicate that most of the TDP's would likely have been adequate if certain devices had been employed, or more effectively employed. The following two representative examples are relevant to this point:

1. Weak TDP/Contract Failure.

In one contract the intent of the procurement, from all overt indicators, was mass production of a given item. Yet a portion of the design was not disclosed and the contractor was charged with producing the item anyway. He could not do it without developing that portion of

the missing design detail. The original TDP was not adequate for its apparent intended use and it was neither supplemented nor supported. The contract was a failure; the parties could not amicably reconcile their differences, and it is presently in the courts.

2. Weak TDP/Contract Success.

In another contract, however, all drawings were deliberately omitted from the contract because they were known to be grossly defective; a performance specification was delineated and established as the controlling document; a model was furnished to be reverse engineered (even though it was an obsolete version); extensive exceptions and additions were taken to the performance specification in the contract document; the defective drawings were furnished but only as a guide and were in no way to be construed as part of the formal TDP. Yet, the TDP, as communicated, was quite adequate for its intended use in producing a volume of hardware. The contract was an obvious success. The contractor even offered to correct the defective drawings and to furnish a complete TDP at the end of his contract for a very nominal price.

The Critical Importance of Communication

In the first example above, since the design was not fully disclosed it did, in fact, bring about a contract failure. It might not have failed had the missing design data been explicitly stated as an integral part of the procurement action. This deceptively simple and obvious deduction is borne out by the second example where knowledge as to the defective data was, in fact, communicated by the engineering activity to the PCO and in

turn to the contractor, and the contract resulted in a successful procurement. This set of contrasting examples is by no means unique.

In the course of this study, American industrial firms, as a whole, exhibited high versatility and cooperation. It is attributable to the contractors and in-house personnel as well that the Government did not experience more trouble than it did. There were numerous instances where the compilation of the procurement package obviously left much to be desired; yet, the overall contract performance was exemplary. Sometimes the reasons could be traced to the persistence and impetus provided by one or a few conscientious Government people. Other times it was traceable to a contractor who cared both about the hardware and the ethics involved.

Although obvious to almost everyone, it must be emphasized that the fundamental cause of the problem is communication. Still further, the issue is not whether the people can communicate, for it is being accomplished quite effectively everyday. The issue is whether the people will communicate in view of the obstacles that must be overcome. Each party usually can and will perform his role well if he knows what is to be specifically accomplished as an output and what are the strengths and weaknesses of the input. One fundamental cause of failure to perform well in "first competitive buys" appears to relate to a lack of communication: the parties were not sure what the input was or for that matter, what the output was supposed to be.

The Pivotal Question: Not Whether But Which Way?

The In-House Trade-Off Decisions

In most procurement actions the question is not whether the TDP can be used to solicit and award competitively; it is a matter of trading-off between alternatives as to which way to achieve a successful procurement. If the proper course of action is not evident, the dilemma is often resolved by the person or office with the most leverage. If it is most important to emphasize price, an "open market" IFB may result. If technical expertise is paramount, a Request for Proposal may be limited to sources meeting the required qualifications. In many procurement actions observed, there were flurries of activity, prior to solicitation, to attain a position that would enable the Government to solicit only the most expert prospective contractors.

In one contract, for example, the project manager wanted a single source determination initially, but the pressure to obtain competitive savings were overriding; a two-step IFB and limited source competition was considered in an attempt to compete among only the most qualified firms; it became apparent, after debate, that any good contractor could do the job; finally, the Small Business Advisor felt that it would easily qualify as a small business set aside. Eventually a compromise was reached and the solicitation was issued to unrestricted open-market competition.

Very often the specialists involved and the PCO do not understand why they need to solicit only the most able firms. They only know, intuitively, that the contract performance will be better if they are

lucky enough to effect an award to a proven reliable performer or better still the previous producer. Is the real reason because anyone less able would be "unable" to manufacture the item? Or, is it because anyone less able would be unable (or unwilling) to interpret and understand the implicit details of the overall specifications and drawings?

The New Contractor's Trade-Off Decisions

At the time of award there is usually little doubt that the new contractor selected will be "able" to perform. The only question is how long will it be delayed and how much additional cost will be necessary. In other words, under which conditions will the N-KR be "able" to perform?

There are two types of inability: an inability to perform and an inability to interpret the TDP. It is a natural separation of sorts. The overview of the 100 contracts studied indicates that "ability to perform" was not the major issue; i.e., eighty-one (81) of the N-KR's were in fact able to perform; 9 were not able to perform; and 10 contracts were still in a questionable state. Most delays and cost increases observed, with regard to technical ability, were caused by confrontations to clarify the details in the PP as to which way the contract would be performed. When the contract was awarded to the DP-KR or one of his key subcontractors, such clarifications were seldom necessary. They apparently knew how to interpret the details of the TDP and the initial explicit communication was sufficient. The implicit was already possessed.

Such an observation was the genesis of this study: Why does the Government have relatively trouble free contracts with previous sources and troublesome contracts with new sources, when theoretically they use

the same technical data package? The TDP should suffice equally well for either type of contractor, experienced or inexperienced.

The Missing Opportunity for Questioning and Reply

It is probably common and generally accepted knowledge, in the subject of business communication, that a supervisor cannot tell an employee how to perform, at least not in precise detail. The employee must cooperate and share in the delegation of the work directives; i.e., in addition to being told, the employee must also "receive and accept" the directive or else the actual delegation has not been made. Preferably the supervisor will delegate the task in terms of its end objective, and preferably the employee will receive it that way--free to fill in the details by himself. Either way, however, there should be open opportunity for further inquiry and feedback from both parties to clarify matters. If the end objective is explicitly delegated without opportunity for feedback, the risks are very high that the implicit details will be accidentally or deliberately misunderstood; if a misunderstanding does occur, the consequences to both parties are usually quite severe. Such consequences can be reduced or almost eliminated by the additional provision of an "opportunity" between the parties to permit clarification.

The same principle applies between the Government office that acquired the technical data package and determined it to be adequate for competitive procurement and the office that is delegated the task of utilizing the data package effectively. The principle also applies between the buyer and seller. The PCO explicitly delegates the objective and sets

forth the details as best he can. But many implicit matters must, of necessity, be left unsaid; and many details, of necessity, will subsequently have to be clarified. (See Figure 12.)

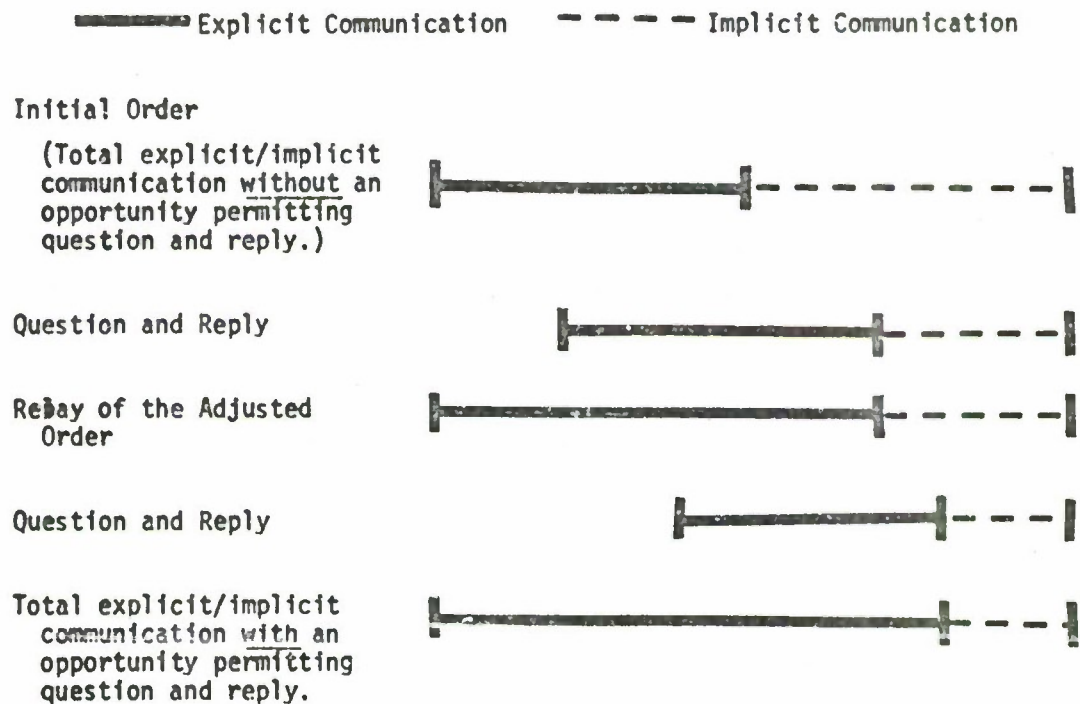


FIGURE 12. One Way to Increase the Effectiveness Of Communication: Provide an Opportunity For Question and Reply.

The QUE Concept: The Need for Clarification of the TOP to Accomplish Objectives

One essential element in human relations seems to be missing in competitive reprocurment of Military Design Equipment. The "system" has no distinct mechanism to effectively permit questioning and reply

between the various disciplines and parties to the transaction. The "concept" of a missing element, as it were, seems to logically take shape as follows:

The technical data package is the major input and common connecting link between all parties to the transaction. Each person that receives the technical data package for appropriate disciplinary processing and use in the performance of a specific function must ask of himself one requisite question: "How do I appropriately use the technical data package, in whatever relative state of quality that it now exists, to accomplish that which I am charged to do, within the environment that now exists?" If the individual does not know the answer to this essential functional question, he must pursue it, by questioning the transmitter to the breadth and depth that is necessary to achieve clarification. Frequently, the technical data package is too complex and involved to be transmitted without a formal opportunity for a question and reply exchange. Furthermore, all individuals are not equally expert; some need an opportunity for exchange more than others. This is compounded by the fact that all involved personnel, both Government and industry, attempt to use the documentation peculiar to the developer.

It is these factors--Quality, Use, and Environment of the technical data package--that make up the QUE Concept this study has identified and used in analysis.

During the observations of this study it was apparent that the essential QUE Concept question was often unasked and unanswered. The reason it is often unasked and unanswered seems to be that few people know

and understand the relative state of quality of the PP. It evolves toward "adequacy" after diverse efforts and extended time, and at some point in time it is held to be "adequate." It is transmitted as something that is "adequate." But the needs of many subsequent parties to the transaction go beyond the description provided by the term "adequate." The need is for basic knowledge that is left unstated; i.e., it is "adequate, if ...", or similarly, it is "adequate, but ..."

The recipient of the TDP labeled as adequate is deterred from posing the QUE question. Accordingly he may proceed to perform without caution or clarification. Thus, the QUE Concept requisite question appeared to be a missing element in the mainstream of activity; it seemed to jeopardize the effectiveness of the overall transmission process. Each confrontation growing from failure to ask the QUE question has the potential of resulting in a cost or time increase in the procurement.

It is not an efficient method of doing business. Usually one or both of the parties to the transaction is left dissatisfied with the performance of the other. If the customer insists upon satisfaction (and most customers in Military procurement do insist) there is little recourse other than to serially adjust the time and cost agreements as each confrontation occurs.

This is not to say that the questioning and reply process does not take place. It does. It must, or very little work would get accomplished. But the efforts are fragmented. They are not coordinated well and objectivity is often lost in the shuffle of piecemeal efforts. Devices and techniques used by one discipline to accomplish an objective are often dissipated by different short run objectives of other disciplines.

The Influence of the QUE Concept

The QUE concept, that is, the need for clarification of the TDP, influences four types of activity in the total process of transmitting PTR's:

1. The Government team in its role as transfer agent
2. The selection of the new contractors
3. The delegation of work to the new contractors
4. The performance of work by the contractor

Each of these points will be discussed in turn.

The Government Team as Transfer Agent

The people on the technical side of the Government house, including design, production and product assurance engineers and technicians, packaging and maintenance specialists, etc., each and all touch the TDP that has been acquired for competitive reprocurement purposes and add their individual disciplinary contribution. The sum of this technical effort is typically very complex. As it is transmitted to the purchasing side of the Government house, the TDP, figuratively speaking, has a "rubber band" around it and a letter of transmittal or a disposition form. The rubber band may be around the drawings, specifications and other data, or it may be around a box of aperture cards containing micro-fish copies of the technical data. Whichever media, the rubber band is around the TDP, and it often is left on until time to relay it by further transmission to the prospective offerors.

Two ideological camps form around this issue. One holds that the buyer (e.g., contract specialist, procurement officer, procurement

specialist, etc.) should take the rubber band off and challenge all inputs. The other camp asserts that there is nothing to be accomplished by taking the rubber band off because: (1) that which is inside is too complex to unravel, (2) it's the other man's job to be responsible for the contents, and (3) still further, the other man has the budgeted time and funding to do the job. The latter theory holds that specialists simply must rely upon one another; since the disposition forms state that the data package is "adequate" for competitive reprocurement, it surely must be adequate, and therefore the task at hand is to draft a solicitation, solicit the market place, and consummate a contract.

The buyer thereupon adds his contributions via essentially three objective review points: a procurement analyst review, a legal counsel review, and a board of awards or management review to the contracting officer. Each of the people at these review points are caught in the same dilemma that the buyer was in; i.e., "Should we or should we not take the rubber band off the TDP? What do we accomplish if we do?" Normally, the composite recommendation is submitted to the contracting officer for signature committing the Government, and he may or may not remove the rubber band.

Thus, there is a procurement, a legal, and a management oriented check and balance technique at work wherein each recommendation is checked by someone other than the person who prepared the recommendation. Yet, often not one person challenged the recommendations of the technical disciplines that transmitted the TDP. Surely a check and balance occurred

separately within each of those disciplines--but there did not appear to be a fully effective check and balance between disciplines.

This investigation found very few instances where contracting officers had challenged the TDP in depth, prior to solicitation.¹ Yet, it is maintained that if the challenges had occurred, the additional information would have enlightened the PCO's. The general line of questioning would have been as follows:

1. Does it have all the design disclosure, or is some redesign necessary? If so, will a firm with some particular expertise be necessary?

2. What is the document that controls the procurement? Are the detailed drawings likely to control it under the implied warranty concept? Can anything be accomplished by demanding otherwise?

3. Is there any reason to suspect inaccuracy, either that a gross error might be contained within the TDP or voluminous minor defects?

4. Is the status of the documents current or is it in flux? Are drawings still being updated by a previous producer? Will they become applicable to the subject procurement after award?

5. How many deviations or waivers have been applicable to this requirement in the past?

6. What were the historical problems of the previous procurements with respect to processing changes, tests and acceptance?

¹Often Administrative Lead Time (ALT) constraints do not accommodate extensive analysis of the TDP by the PCO.

It may be argued that the answers to such questions are neither "askable" nor "answerable" unless both the inquirer and the respondent can speak in the same technical language. In addition, the act of raising pertinent questions does not in itself yield acceptable answers.

Still further, each discipline has enough relevant technology to master without worrying about the other fellow's as well. It may also be argued that in many contract actions the parties do have the benefit of effective intercourse between disciplines. These arguments are probably valid to a degree; they are most often true where procurement strategy conferences are held as in critical, vital, high dollar value actions, or in contracts where it is obviously necessary to take the rubber band off the TDP. Therefore, any approach toward solution should encompass the merits of these arguments.

It may also be argued that many people are actively involved, and all of them are concerned about the end objective. Therefore, one way or another, the necessary technical questions get asked and answered, by one person or another, at one time or another. But do these questions and answers, as a routine procedure, ever get comprehensively coordinated into a single set of knowledge--a "diary" so to speak--that can be reviewed objectively from a technical standpoint by a person other than the originators of the recommendation? Does the contracting officer have anyone to ask, "What do you think--from a technical point of view--of this recommendation that is placed before me?" Whom can the procurement analyst ask if he has a similar question? Whom can the attorney ask? Of at least

equal importance, whom can the buyer ask? They must turn to the people who have the mission responsibility--the people who helped prepare the technical recommendations. In other words, there does not appear to be a systematic check and balance organizational unit between disciplines to assure that the essential human relations functional question does not go by unasked and unanswered. The technical data package is the most important input and single link between the several disciplines trying to accomplish a given reprocurement action. It is the essence of the total communication task. It cannot be "adequate" by itself; it must be used as intended. The only apparent way to determine those intentions is for a qualified person to start by posing the "QUE" question. It is then necessary that he pursue the natural line of questioning in such a way that each contributing specialist thereafter can be informed of the intended use of the technical data package. In this way each specialist can be helped to understand the relative quality of the input that he is charged to process.

At present, the solicitation is commonly drafted without full investigation into the basic issues--the strengths and potential weakness of the technical data, as stated above. The solicitation is disseminated among "open market" competition with a natural emphasis on price as the primary evaluation criteria for selection of a contractor. This tends to attract contractors who have a relatively low overhead factor and perhaps correspondingly lower available resources to apply to the performance of the contract. When such resources are required, prospective offerors are

often not so notified. Many requirements are typically "urgent", therefore, the solicitation "on-the-street" time is commonly compressed. Such a compression of time at this point, forces prospective offerors to compress their efforts to review the procurement package, do preliminary production engineering, prepare an estimate, and submit a bid. Thus, interested offerors are either deterred altogether or are forced to take time and cost risks that may subsequently have to be measured more closely. The copies of the data package are often incomplete or illegible during the solicitation period, and some prospective offerors may need the missing information to keenly compete. The available lead time, however, will often not permit extension of the opening date. There again, anxious offerors are forced to assume risks that may have to be measured more closely after award.

The administration of the contract is often accomplished by literal interpretation of the terms of the contract. While this may be entirely proper, it often is not a practical course of action vis-a-vis an unproven data package.

Relying on the unproven TDP, the Government frequently neglects to consider its own objectives: first competitive buys tend to be lumped together with other, more "normal" procurements, for "routine" contract administration; it is often untimely and unsuitable with respect to the furnishing of property; technical assistance is sometimes not provided or provided ineffectively; and response to technical requests by the contractor are often delayed.

Changes to the contract are often lumped together as to kind of change and approved into the contract without benefit of concurrent price and time negotiation or even ceilings on price and time. The intent is to continue progress under the contract and to settle controversial cost and time issues later. But it is difficult to assess the true impact of engineering changes, waivers, deviations. One party may be at the mercy of the other if the work is already done at the time the changes are negotiated .

Such contract administration breakdowns tend to aggravate any natural inabilities and negative motivations of the new contractor. It compounds the consequences of other confrontations and misunderstandings.

It is suggested that one fundamental cause of the problem in first competitive buys is that the Government does not have an effective mechanism to assure technical assessment and control during solicitation, award and contract administration.

The Selection of a New Contractor

The effective use of the TDP in selecting a new contractor is dependent upon the QUE concept. That is, the set of people responsible for selecting a new contractor from a competitive group of prospective contractors look to price and the pre-award survey (PAS) in that order, as their primary guidelines. Low price without an acceptable PAS is not directly significant unless the proposed firm is so obviously responsible that a PAS would be unnecessary. This is seldom the case in first competitive buys. There is more, however, to the relationship between price and the pre-award survey than first meets the eye, as the following discussion indicates.

As stated before, the "system" of emphasizing price in production contracts based upon firm specifications tends to encourage contractors who happen to have a low overhead and to discourage contractors with high overhead factors. Occasionally the quantity is sufficiently large to preclude the tendency; in such procurements, differences in overhead can be spread over more units, plant efficiency may have more influence, and the "quantity" per se may preclude award to any firm without great capacity.

It is a commonplace event, in competitive reprocurments of MDE, that the low bidder/offeror is a relatively unknown firm and that extensive efforts are often conducted to survey the responsibility of the firm. The first question that a member of the PAS team needs to ask is the QUE concept question. The question may be explicitly asked or not. But it is surely implicit, for the PAS team cannot do its job without inquiring into the technical data package. The depth to which they inquire largely determines ~~their~~ ability to assess the ability of the N-KR to use the data.

As previously pointed out, a contractor's technical ability has two distinct facets differentiated as follows:

1. First, he may or may not be able and motivated to interpret the TDP.
2. Secondly, he may or may not be able and motivated to manufacture the hardware.

The PAS team may be relatively efficient at determining the second facet, especially if they have PCO representation on their team to technically assist them in understanding the technical requirements. But they

are almost helpless to determine the first facet. That is, they cannot effectively discern the kinds and extent of TDP clarification that will be needed.

A TDP is not equally adequate for all firms; and the results of this study indicate that given enough clarification, technical assistance, waivers, etc., most N-KR's are technically able to manufacture the item. But most of the unplanned and undesirable contract modifications arise as a result of various technical interpretations of the TDP. "Interpretability" is hopelessly enmeshed between ability and motivation. That is, if a contractor receives the award and subsequently discovers that he is unable to meet the time and price parameters, he may be strongly motivated to interpret the TDP in a way which will bring about schedule extensions and price increases. During the course of this study, hundreds of pieces of correspondence provided evidence of this situation.

A recent case, ASBCA 88,839, also exemplifies these points.¹ In this case the contractor stated to the PAS team at the time of the pre-award survey, that the TDP contained illegible drawings and that some appeared to be missing. The PAS team, previously unaware of this condition, promptly conferred with both the PCO and the N-KR. The issue was resolved by obtaining a letter to the effect that the defective TDP would not deter the N-KR in the performance of his contract nor be cause for a subsequent price increase. After award the contractor did request recovery of additional costs in spite of his written certification and the ASBCA denied his request because of the certification.

¹Contractor Bound by Promises Made to a Pre-Award Survey Team, Government Contracts Reports, Number 302, December 31, 1970. Commerce Clearing House, Inc., pp. 1-2.

The question pertinent to the above case is, "What if the contractor had not mentioned the defective TDP, and the PAS team had not taken action to rectify the adverse condition before it became formalized into a contract?" Unfortunately this condition appears to be the rule rather than the exception. And in such events, the PAS team recommends award without the benefit of full knowledge, and the technical defects remain unidentified until after award. Match up an unproven producer with an unproven TDP and the odds are very great that unplanned and undesirable contract modifications will occur. This is exactly what happens in many first competitive buys; the "system" almost dictates that it will frequently happen.

The PAS team can often only generalize as to the technical ability of a prospective N-KR, and the team is nearly helpless to validly assess the contractor's motivation to cooperatively interpret the details of the data package. This is one of the fundamental causes of the failure to effectively transmit procurement technical requirements.

The Delegation of Work to the New Contractor

As work is delegated by the PCO to the N-KR via a contract, the N-KR will need to know the following things with reasonable certainty. This means that he may have to clarify some details if he is not certain.

1. The N-KR will need to know whether the technical data is complete, legible and reproducible. Not all TDP's are this way when issued during solicitation. They may be sufficient for estimating and bid purposes, but insufficient to firm up production plans and procurement commitments.
2. The N-KR will need to know whether the design disclosure will actually permit him to fabricate the item in such a way that it will attain

the essential functional characteristics that the customer requires. That is, does the TDP have any apparent gross defects? How many and what kind of minor errors and inconsistencies will have to be corrected? Is it normal and natural to review the technical data for such answers prior to "cutting iron." A review is the only way it can be accomplished--and the N-KR may have some questions as a result of the review.

3. The N-KR will need to know the kinds and extent of production engineering that has been done by the customer, what is relevant to his plant, and what additional production engineering must be accomplished before "cutting iron." Depending upon his technical approach, the technical data will likely have some conditions that would make it impossible or impracticable for him to manufacture or assemble the item as he proposes. Thus, if those constraints in the technical data can be lifted without affecting the essential physical and functional characteristics of the item, it will be necessary to request that the changes be made. Such a review is normal and natural, and the N-KR may have some questions and details to clarify as a result of the review.

4. The N-KR will need to verify that all vendor specialty parts and commercial materials are available to him in a timely and suitable manner. If he did not do this prior to submitting his bid, it must surely be done before "cutting iron." If any parts or materials are not available he must clarify this matter with the customer and find a way to reconcile the fact.

5. The N-KR will need to assure himself that the quality assurance provisions are compatible with the physical and functional requirements

toward which he must build, inspect, and test. If they are not compatible, one or the other will have to be changed. Such issues may have to be clarified with the customer in case of doubt.

6. The N-KR will also need to pursue the matter of potential incompatibilities through all the various types and kinds of data. The ultimate test of the delegation of work is whether he can accomplish reproduction of the hardware. Surely he will want and need to review this matter before "cutting iron." He may have some questions to clarify as a result of the review.

The above examples seem to describe a "normal" situation in many walks of life and kinds of work delegation between supervisors and employees, as well as between buyers and sellers. All recipients of specified data have to assure themselves as to the data and may need to have details clarified. Why should the scheme be any different in competitive reprourement of MDE? Yet it is, in fact, different! All categories of clarification, "1" through "6" above must presently be assessed as to cost and time impacts through the "changes" clause of the contracts.

One bedrock premise underlying the function of competitive reprourement is: if a production line is to be transferred from one source to another, the recipient of the documented information must be willing and able to see, hear, think, understand, and use the knowledge that was generated in the development and first production efforts. All other accomplishments, however laudable, in communicating technology will be of little avail if the new competitively selected contractor is unable or

or unwilling to "receive and accept" the objectives of the delegation and to utilize such knowledge.

The group of people, have been conceptually identified as one of the primary obstacles to effective communication. The reason appears to be that the "system" does not include a mechanism to permit that one essential element in human relations to be accomplished; that is, there is little opportunity to question and reply as work is delegated. Thus the actual delegation is often not consummated prior to "cutting iron", in spite of the fact that a contract has been signed. Each question over each detail not initially understood must eventually be asked, and each reply must eventually be made. But why should this activity be done after irreversible obligations have been made and work has been started? Why should each question and each reply over relatively minor details automatically affect the time and cost parameters of the contract?

In order to fully address the above questions, one must recognize that the Government has traditionally procured MDE via the fixed specification--fixed price system, assuming that the actual delegation of work objectives takes place simultaneously with the signing of the contract. It is just this assumption that seems to contribute to incomplete delegation of work when the TDP is competitively unproven. This appears to be one of the fundamental causes of the problem in transmitting procurement technical requirements.

The Performance of the Work by the New Contractor

The relative difference in ability and expertise between contractors is such that some contractors, otherwise quite able to manufacture the item,

are less able than other firms to interpret the details of the TDP. They therefore need to have clarification that the more expert contractors and previous producers do not need. Significantly, it is doubtful that most such contractors actually need additional time or money as a result of such clarifications.

If the additional time and money is legally due to them as a contractual right, contractors can be observed to follow a spectrum between two extreme policies: one group will insist upon every last day and dollar due to them under the structured terms of the contract; another group will deliberately not extract "blood" from each transaction.

The structuring of a contract is of paramount importance. If it is structured in such a way that each missing detail on a drawing, however minor, and each approval of a waiver, however minor, must be negotiated as to its impact on cost and schedule, there will inevitably be fluctuations in the cost and schedule. If the contract is structured to permit opportunity for cost free and time free questioning and reply, then one of the fundamental causes of the problem in transmitting procurement technical requirements could be eliminated.

A Synthesis of the General Causal Patterns:
What is the Real Problem?

It was submitted earlier that the reprocurement of Military Design Equipment tends to have a lower competitive potential than is desirable. It was later pointed out that initial competitive reprocurements tend to have a greater incidence of unplanned and undesirable contract modifications than is acceptable.

At this point in the study some covert aspects and causal patterns of the problem have been identified. It is clearly indicated that the problem can be related to the effectiveness of the process of transmitting PTR's. That is, the process of transmitting PTR's is not fully effective notwithstanding the intrinsic "adequacy" of the technical data package as it may have been acquired from development organizations and initial producers.

Operational Problem: Not Fully Effective Procedures

The problem can now be stated that the routine procedures of transmitting PTR's are not fully effective to permit:

1. Acceptance of Delegated Work Objectives Between In-House Governmental Disciplines.

The routine is that the technical data is transmitted by one directorate and received by another without challenge as to details. The acceptance of the delegated work is therefore made without full knowledge and understanding of that which is being accepted.

2. Objective-Oriented Contract Execution by the Procurement Discipline.

Comprehensive but concise and intelligible technical information is commonly not available to facilitate the work of function specialists and the analyses conducted during the legal, procurement and management reviews. Each specialist, therefore, must rely on the assumption that the TDP is "adequate" and cannot appropriately utilize his functional expertise to offset any shortcomings therein.

3. Objective-Oriented Selection of a New Contractor.

The pre-award survey (PAS) process is often conducted without an investigation into some of the basic underlying issues for want of information explaining those issues. Accordingly, the PAS team members are only partially able to discern the technical ability of the offeror to perform the special and peculiar types of work under the contract and must generalize to a degree in its recommendations to the PCO. In addition, there is little realism associated with the measurement and assessment of the offeror's motivation to cooperatively interpret and use the unproven TDP as it was intended to be interpreted and used. In two ways then, ability and motivation, the PAS team often permits a potentially non-responsible contractor to appear responsible.

4. Acceptance of the Objectives of Contractually Delegated Work by a Newly Selected Contractor.

The "actual" delegation of work to a contractor often does not occur at the time the contract is signed; some degree of technical clarification is usually necessary before real work progress can be started. Accordingly, many contracts do not get off the ground without several early contractual modifications to adjust the technical details and other matters that relate to the initial delegation of work.

5. Objective-Oriented Performance of Work by the Contractor.

The performance of the work by the N-KR must be screened detail by detail against the cost and time parameters, notwithstanding the probability that many confrontations are minor requests for clarification for which additional cost or time would not normally be expected or

necessary in any other business transaction. The typical MDE contract is structured as though minor changes and clarifications would not be necessary. The fact that they usually are necessary automatically creates a legal right accruable to the N-K? and he often insists upon receiving compensation.

6. Objective-Oriented Contract Administration.

The administration of contracts involving first competitive buys is often accomplished by literal interpretation of the terms of the contract in the same manner as more routine buys. In the event of an unproven data package where the Government may be vulnerable, such contract administration tends to aggravate any natural inabilities and negative motivations of the new contractor, in addition to compounding the consequences of other confrontations and misunderstandings.

Management Problem: Need for Clarification of the TDP

All of the above routine procedures (1 through 6) are not fully effective largely because the routine procedures to permit clarification of the technical data package are not fully effective: Management has not provided means for this clarification.

Each functional specialist, Government and industry, is charged in some way with processing the technical data. Probably this data is his major input. It is inherently quite complex and unique. It naturally has many facets to be considered each time an incremental decision is made in order to appropriately make the functional decision. Not all functional decision makers are equally expert and experienced in the peculiar equipment being repro cured. Therefore, the procedural system devised to permit

functional processing should make allowances for varying alternative methods of use and varying environmental factors such as the relative abilities of the functional specialists who will use the data package. The existing procedural system does not, routinely, accomodate such variances. It accomodates them only on an exception basis. The "system" is set up as though it is expected that each data package will be adequate, that each functional decision will be appropriate, and that each individual specialist will be expert. The fundamental cause of the problem in transmitting procurement technical requirements appears to be that the real world is not amenable to such an "ideal" set of procedures based upon such an "ideal" set of expectations. In this light, it is not surprising that the result is a high incidence of unplanned and undesirable contract modifications. Accordingly, the whole range of Military Design Equipment has a lower competitive potential than is desirable under the general policy to attain maximum practicable competition.

CHAPTER VII

ANALYSIS AS TO POTENTIAL APPROACHES TOWARD FUNDAMENTAL IMPROVEMENTS

Introductory Discussion

Certainly many factors and events combine to cause unplanned and undesirable modifications to competitive reprocurement contracts for Military Design Equipment. The results of this study, however, indicate that if certain transmission techniques had been employed or more effectively employed, such modifications would have been significantly reduced. The transmission process as currently used in AMC reprocurements of MDE is not fully effective.

By conceptual design this study encompassed a panorama of procurements. In so doing it is recognized that not all reprocurement actions fall within the realm of the observations, logic, and analysis used herein. A large portion, however, of the configuration end items, components and parts that are undergoing reprocurement every working day, are similar to the 100 procurement actions studied. And, they are likely to experience similar adversity unless some fundamental improvements are designed, developed, tested, and implemented. The purpose of this chapter is to suggest some approaches toward such fundamental improvements, and to consider their potential influence on the overall process of transmitting procurement technical requirements.

The first approach to be considered applies to management attitudes regarding the fundamental problem. The next approach will address the

operational problem and suggest three courses of action to improve the six functions delineated on pages 121 through 123 where the existing procedures are not fully effective:

<u>Course of Action</u> (See Ring 2 of Figure 13)	<u>Function</u> (See Ring 3 of Figure 13)
<u>Establish a Technical Objectivity Review (TOR) to assure:</u>	<ol style="list-style-type: none">1. Acceptance of the objectives of delegated work between in-house Governmental disciplines.2. Objective-oriented performance of contract execution by the procuring contracting officer.3. Objective-oriented contract administration by the procuring contracting officer.
<u>Emphasize Special Standards of Responsibility (SSR) to provide for:</u>	<ol style="list-style-type: none">4a. Objective-oriented selection of new contractors with regard to special abilities.
<u>Emphasize Preproduction Evaluation (PPE) Concept to provide for:</u>	<ol style="list-style-type: none">4b. Objective-oriented selection of new contractors with regard to motivation.5. Acceptance of the objectives of contractually delegated work by a selected contractor.6. Objective-oriented performance of work by a new contractor.

Finally this chapter will consider the potential benefits of the suggested approaches toward solutions of the problem in transmitting PTR's.

An Approach Toward Solution Of The Management Problem

There is a need for formal recognition of the QUE Concept, i.e.; the need for clarification of the TDP to accomplish objectives. It has been

shown that the procuring contracting officer does contribute to unplanned and undesirable modifications to contracts based upon "build to" design disclosure packages. The way in which he transmits the procurement technical requirements directly affects the results of the contract.

Since he contributes to the problem, the contracting officer should attempt to assume a greater share of the responsibility for resolving it. In addition, as a uniquely authorized focal point of the Government, the PCO could require the pre-award survey team, prospective offerors, and the contractors receiving award to assume a greater share of the responsibility for resolving the problem, since they also contribute. To perform this task actively and positively, the PCO could provide an opportunity for each participating party--Government and Industry--to question the content of the technical data and the intent of the technical disciplines until each decision maker is assured of the objectives of the proposed procurement action and their own posture to perform successfully.

This would require greater access to the relevant technical knowledge than is presently available. That is, to accomplish objectives, the PCO should attempt to question and provide opportunity for other participants to question the quality of the TDP in order to determine how to appropriately use it in view of the environment of the procurement action (QUE).

At present, the determination of "adequacy" of the TDP is commonly unassailable; therefore, the "firmness" of the procurement package as a composite specification of technical requirements correspondingly tends

to be unassailable. Both are not, in fact, unassailable, but are commonly deemed to be; the system tends to demand compulsory acceptance of the two terms. Many related operational decisions and actions are therefore determined and structured based upon a nebulous premise as connoted by the terms "adequacy" and "firmness."

The observations and analyses of this study indicate that TDP's have relative quality levels with a high and a low and a range in between. Even a "high quality" TDP contains, of necessity, a significant degree of implicit specification. Thereafter, as TDP's are transmitted, relative environmental factors must also be considered. The TDP is typically of such complexity and uniqueness that even the most expert specialists and contractors operating under near "ideal" conditions, will still need to ask certain questions and will need certain replies.

All three factors are relative: Quality, Use, and Environment; and, the routine procurement procedures should be structured to accommodate certain reasonable variations and alternatives without revisions and modifications of the cost and time agreements.

Such knowledge is not particularly new knowledge. It has been recognized by many practitioners for several years. But a tradition seems to have evolved that TDP's are adequate and procurement packages are firm--per se. This tradition seriously impedes widespread recognition and emphasis of the knowledge. There is a general reluctance to acknowledge much less innovate to overcome the fact that in "first competitive buys" TDP's are not necessarily "adequate" per se, and that PP's are not necessarily "firm specifications" per se. They may

be adequate only if used appropriately to solicit and select contractors. Similarly they may be firm enough to solicit "open-market" competition and firmly fix price and time arrangements providing the prospective offerors have the opportunity to assess and understand the relative degree of firmness and to assess the relative adequacy for their organization prior to submitting their offers and entering into contracts.

Therefore, it is concluded that a fundamental approach toward improving the process of transmitting procurement technical requirements is to recognize and emphasize the human need for clarification of complex and unique inputs to their functional task. The technological barrier in competitive reprocurments of MDE exists largely because the people involved cannot effectively communicate and do business in terms of the objectives of the procurement. One fundamental approach toward solution would be to provide an opportunity for them to do so.

An Approach Toward Solution Of The Operational Problem

Establish a Technical Objectivity Review

There is a need for formal establishment of a technical objectivity review (TOR) procedure and organizational entity to facilitate Government coordination and functional processing throughout contract execution and contract administration. It is probable that without comprehensive legal and procurement objectivity reviews, the Government would experience

many times more legal and procurement flavored problems than are currently experienced. Since the contract modifying confrontations identified in Figure 8 are for the most part technically flavored issues, it is possible, even probable, that many confrontations could be eliminated or the severity reduced by a better review of the technical aspects than is presently conducted during the performance of solicitation, award and contract administration functions. One way to increase functional effectiveness is to emphasize objectivity; one way to enhance objectivity in a functional specialty is to establish an objectivity review point in the functional chain.

Such an improved technical objectivity review (TOR) should be the responsibility of a formal office, free from the work load of other major mission assignments of either a functional or commodity nature. Organizationally, the TOR could be done by a separate office or perhaps be performed in combination with the procurement analyst team that presently reviews procurement actions. The background of the TOR members would likely be that of an industrial specialist with both procurement knowledge and production engineering orientation.

Policy and operating procedure would need to be developed--perhaps tailored to each parent organization--then tested and implemented.

The primary purpose of the TOR would be threefold: to improve the effectiveness of the PCO's acceptance of objectives, contract execution and contract administration. These are discussed below.

Function 1: Acceptance of the Objectives of the Competitive Reprocurement TDP by the PCO.

In this category of improvement the purpose of the TOR office would be to accomplish early "assessment" of the relative quality of the TDP in order to understand potential shortcomings and their competitive procurement implications. It would be to accomplish an effectivity review of the TDP prior to "acceptance" by the PCO. This may require liaison with the various participating organizational units responsible for the TDP. (The TOR may well participate in the acceptance of the TDP from the DP-KR.) Such liaison may be performed during the compilation of the TDP and PP but prior to issuance of a solicitation.

The "assessment" of the effectivity of the TDP would embody as many relevant aspects as deemed necessary. Some constraints that may be inherent in the TDP are: vendor source constraints; lead time constraints to permit evaluation, process and production engineering prior to and after award; "rate" constraints regarding fabrication, assembly, test expertise, facilities, tooling, equipment, and product assurance. The probability of the existence of minor inaccuracies and gross design defects should also be assessed along with completeness, clarity, and impact of any potential changes to the TDP that may be in-process.

Still further, any limitations should be assessed as to in-house capabilities to provide technical assistance, to analyze the impact of engineering change orders, to furnish any necessary equipment, material or other property--and to be generally "responsive" during contract administration.

A TOR office could then transmit the overall assessment of the TDP in the vernacular of the purchasing and contracting profession. Armed with an understanding of such detailed, but significant aspects of the technical requirements, contracting officers, contract specialists, procurement agents and analysts could meaningfully receive and accept the objectives of the technical documentation and appropriately plan their functional activity. The spirit of the intent as well as the technical documentation would then be communicated.

Function 2: Objective-Oriented Performance of Contract Execution By The Government.

In this category of improvement, the purpose of the TOR Office would be to facilitate the efforts of contracting officers and specialists and to provide technical counsel during the execution of solicitations and resulting contracts.

The analysis of Chapter VI indicates that functional specialists and analysts may subsequently need additional clarification after receipt and acceptance of the TDP, depending upon their individual expertise and other environmental conditions. Furthermore, the major recommendations of the specialists and analysts should be subjected to a third party review for technical objectivity and effectivity prior to commitment.

Thus both the operational and the managerial personnel responsible for executing contracts would be provided with a structured opportunity for technical questioning and reply regarding the quality of their major

input (the TOP) and the appropriate use of it in view of the given environment (QUE). Matters which require still additional clarification could be resolved by reference to the organization with mission responsibility for the requirements.

Function 3: Objective-Oriented Contract Administration by the Government.

In this category of improvement, the purpose of the TOR Office would be similar to that described above, except that it would specifically be addressed to improving contract administration. In "first competitive buys" of complex military design equipment the PCO tends to be proportionally more involved in contract administration functions than in subsequent reprocurments where the DCAS-ACO assumes the more active role. The reasons for this increase of PCO involvement are traceable back to the reasons for the confrontations cited in Figure 8 and 9. That is, there is a greater need for clarification of the initial technical understandings as depicted by the procurement package. These matters must largely be resolved by PCO rather than the ACO because only the procuring activity can interpret its own desires and intent and subsequently approve and fund the necessary changes. Whichever way the PCO/ACO interface may be structured in a given delegation of authority, both contracting officers are interested and may be actively involved in post award matters.

Accordingly, many incremental decisions may be made after the award of a contract by several differing offices to effect engineering changes, to adjust property provisions, to provide technical assistance, to evaluate the merits and validity of confrontations between the parties, to negotiate and equitably allocate the cost and time consequences, and

to modify the contract. Each such incremental decision is influenced by the QUE Concept. It probably should be made with the benefit of technical objectivity and then be subjected to a third party technical review of the recommendation.

In this manner the TOR would improve both operations and management during the PCO/ACO interchange and mutual involvement in contract administration.¹

Emphasize Special Standards or Responsibility (SSR)

There is a need for increased emphasis and utilization of special standards of responsibility to facilitate more meaningful selection of contractors. The primary manner in which a PAS team can reduce the incidence and severity of unplanned and undesirable contractual modifications is to make every effort to be certain that the prospective prime and his anticipated subcontractors have the management and technical ability to fabricate and assemble the item and to do it within the known time and price constraints. There must be few of the specially relevant stones unturned, or else the offeror may initially appear to be responsible and later become somewhat irresponsible. It follows that to accomplish such a careful analysis, the PAS team needs to be privy to the covert aspects of the TDP to know and understand its relative state of quality and any peculiar aspects.

¹On page 28 it was noted that post award confrontations continue to occur, although at a diminishing rate, until the TDP has been used in several competitive reprocurments. The utility of the TOR functions would therefore extend beyond the "first competitive buy"; the TOR contribution could be significant throughout several subsequent procurements.

Special expertise or special facilities may not be a necessary prerequisite to reproduction for a clearly capable, proven reliable firm or the previous producer. But any unusual requirements or aspects of the procurement may have special applicability and significance to an unproven producer and one whose capability is questionable. By definition, most industrial firms qualify as unproven, questionably capable producers because "first competitive buys" are inherently for unique items designed peculiarly to meet unique military applications.

Function 4a: Objective-Oriented Selection of New Contractors With
Regard to Special Abilities.

The above logic indicates that special standards of responsibility (ASPR 1-903) may be almost universally applicable to complex first competitive reprocurments of MDE. At present they seem to be utilized only on an exception basis. If the lack of requirements for special expertise and facilities were viewed as an exception rather as a rule, this attitude could provide for procedural analysis of any special abilities that may be required of prospective contractors whatever the nature of the MDE item or part to be reprocured. It should also provide a basis for questioning and reply regarding this important fact. In order to explicitly predetermine the special standards to be put in a solicitation, wherein they would be equally applicable to all prospective offerors, it would be necessary to clarify details.

Without the Special Standards of Responsibility tool (and many contracts observed were conspicuous by the absence of it) the people responsible for selecting the contractors must operate partially blind. Ergo the first essential QUE Concept question often goes unasked and unanswered.

With this tool or device, however, the DCAS PAS team, with PCO technical representation, could increase its effectiveness in assessing the various abilities of the prospective contractor; they would have an opportunity for meaningful questioning and reply; they would have an opportunity for meaningful measure by which to evaluate responsibility; accordingly they could conduct special capability and special facility studies wherever the need was indicated. Thereby, they could sharply reduce the likelihood that unplanned and undesirable contract modifications would prevail throughout contract performance.

Emphasize the Use of PPE

There is a need for increased emphasis and utilization of the existing Preproduction Evaluation Concept (PPE). Several devices are available to permit an improved delegation of work to the contractor. For example, as listed in Chapter IV, one major subordinate command routinely uses a formal device for the transmission

of the procurement package whereupon the contractor must review the data package and certify within so many days after award that it is complete, legible, and reproducible. This simple technique permits a question and reply opportunity for those three matters, and it works--i.e., it accomplishes the objective. Other commands could have avoided many unplanned and undesirable modifications to their contracts over these same three matters had they used such a device.

Similarly, the Preproduction Evaluation Contract (PPE) device is currently available for use and it is objective oriented. In theory it serves to permit exchange of communication in each major technical area without affecting the time and cost parameters of the contract. It is a relatively new concept and is experiencing difficulty getting off the ground. The PPE device was observed in only six out of the 100 procurements studied. But it showed promise in that the incidence of unplanned and undesirable modifications was noticeably reduced.

Some people expect that PPE, when widely accepted, may eliminate 90% of the problem of unplanned and undesirable modifications. The PPE concept may have limited applicability, however, in that it may be

restricted to use where the TDP is "essentially sound." The concept has been tested in the courts and the "essentially sound" criteria was integral to the decision upholding PPE.¹ In this sense, TDP's would have to be not only "adequate" for competitive reprourement but also be an "essentially sound" production baseline to qualify for application of the PPE concept. Conversely, those adequate TDP's that are not "essentially sound" would need to be used in full view of the remaining development work to be done.

The PPE concept is a most obvious example of how objective-oriented "structuring" of a contract can be accomplished. Generally speaking, the PPE concept provides a procedural opportunity for prospective offerors to assess the effectivity of the TDP for their use in meeting the objectives of the procurement. In this way it is possible for offerors to quote a price for achieving the performance objectives of the procurement and still agree to "build to" a design disclosure package. It also procedurally provides for the new contractor to continuously certify throughout performance that the technical data is suitable for his use. As a result, the door is continuously open, and the solicitation and contract structuring technique, as generally embodied in the PPE concept, seems to uniquely accomodate the need for questioning and reply between the Government and the contractor without affecting cost and time parameters.

¹Comptroller General B-16593, Risk of Defects in Government Specifications Comptroller General of the United States, May 23, 1969.

The PPE concept starts with the recognition that the design is not yet proven to be adequate for competitive reprourement, and that additional production engineering will have to be done. It does not warrant, implicitly or explicitly, that if the detailed drawings are followed, a satisfactory product will result. Instead, the Government warrants only that the TDP is essentially sound. Accordingly, it sets forth performance specifications as the controlling documentation and disclaims the data by permitting the contractor to depart from the details of the technical data if he determines and justifies that such changes are required in order to accomplish the following:

1. Maintain the essential function requirements (design);
2. Correction of an impossible or impractical manufacturing or assembly condition (production);
3. Procurement of purchased parts and materials (procurement);
4. Compatibility between Quality Assurance Provisions and the physical and functional requirements (verification);
5. Compatibility between kinds of data.

In this structure the Government Contracting Officer, during solicitation, places prospective offerors on notice regarding the possibility of defects and that additional production engineering is required. Accordingly, the contractor receiving award is asked to conduct a review of the design disclosure, production engineering essentials, compatibility of procurement and quality assurance data, and compatibility between kinds of data, to determine, identify and correct any discrepancy that may be incompatible with the functional or performance requirements. Any engineering

changes discovered during these efforts would be called "compatibility changes."¹ Such "compatibility changes" must be accepted by the contractor without additional cost to the Government and without delay in delivery; making such changes is considered to be within the scope of the contract.

If a major latent defect were to be discovered downstream during a given contract performance the contractor may argue that it does not qualify as a "compatibility change." Accordingly, he may request equitable adjustment under the Changes Article. The Contracting Officer may agree or disagree and unilaterally hold it to be a "compatibility change" within the scope of the contract. As a relief valve, the provisions of the Disputes Clause would then apply and the contractor may appeal to higher authority.

As a result of the careful structuring, the traditional problems of minor, but significant (mutually recognizable) errors and inconsistencies is contained within the PPE concept; the "producibility" changes problem is also contained therein--which most contractors frequently need to overcome impossible or impractical manufacturing and assembly conditions; and finally the problem of minor design defects that are incompatible with performance requirements is contained therein. Latent design defects may go to the heart of the implication that the PP was "essentially sound" and a relief valve is provided. Only the broad category of "improvement" changes remain for processing through the Changes Article of the contract--and such changes as those relating to safety, operational and logistics

¹AMCP 715-6. Preproduction Evaluation (PPE) Contracts, US Army, May 1970, p. A-3.

support, interface matters, value engineering, production stoppage, and cost reduction.¹ Such changes normally do not emanate from the needs of the contractor, but rather from the needs of the Government.

In the PPE concept prospective offerors are asked to estimate the costs of the review and production engineering effort, plus any contingencies deemed necessary for the risks involved. Additional costs and contingencies, if any, are to be added into their competitive price. This tends to demand a careful estimate in the first place based on a preliminary study of the procurement package.

If a given competitor does not have time to conduct such a careful estimate, or feels it beyond his willingness and capability to perform the preproduction evaluations or to assume the risk of some responsibility for the adequacy of the drawings and specifications--he is discouraged from competing. Certainly the PPE concept discourages the unethical practice of "buying in" without any intention of timely delivery at the original contract price.

Conversely the PPE concept encourages the participation of the most qualified and sincerely interested suppliers, contractors that do not plan for and demand price and delivery schedule adjustments through the Changes Article for each error, ambiguity, or incompatibility encountered in the TDP. In addition, PPE greatly reduces the cost of implementing engineering changes and permits more orderly and effective progression of the ongoing program.

¹AMCP 715-5. Preproduction Evaluation (PPE) Contracts, US Army, May 1970, pp. B-4 and B-5.

Such an objective-oriented structured solicitation and contract would seem to qualify as a "firm specification" to be used as a basis for a firm fixed price contract type equally as much as the present mode of specifying by implication--that if the detailed drawings are followed a satisfactory product will result. The most important difference between the two structures is that the PPE Concept has a sense of "reasonableness" about it that the traditional method lacks. It permits that which is essentially necessary for people to communicate and to "do business," notwithstanding the complexity and uniqueness of the work specification.

Therefore, the existing PPE Concept may be a potential boon as a solicitation and contract structural technique. It should improve three functions as follows:

Function 4b: Objective-Oriented Selection of New Contractors With Regard to Motivation.

At present, the pre-award survey (PAS) team, as they submit recommendations to the PCO, must largely assume that prospective contractors will be motivated to interpret the PP cooperatively and with integrity. Yet the anomaly is that contractors are often either forced, or at least invited, to agree to whatever time schedule that may be specified whether or not they can meet it, and to submit a competitive price based on something less than a careful estimate. They are, in a way, induced into post award negative motivation. The PPE Concept, however, would reverse this pattern; it would put teeth in the assumptions of the PAS team because, properly used, it almost precludes rather than induces, post-award negative motivation.

Function 5: Acceptance of the Objectives of Contractually Delegated Work by a Selected Contractor.

At present, after mutual consummation of a contract, extensive effort is expended in analyzing the technical data to assure that it will permit vendor procurement and production commitments. Only after clarifying most of the details, with each clarification subjected to cost and time impact, does the actual receipt and acceptance of the objectives of the procurement take place. Under the present structure, there are few other alternatives because such details must be clarified before proceeding with commitments, in spite of the fact that price and time factors are agreed upon at award. If such details are not reconciled before "cutting iron", the adverse cost and time impact will be even greater. With the use of the PPE structured contract, actual receipt and acceptance of the objectives of the delegated work, by definition, must take place at the time of award. It encourages pre-award reconciliations of details. Immediately following award, PPE procedurally permits any additional necessary reconciliation of the technical data to the objectives of the procurement without cost and time impact.

Function 6: Objective-Oriented Performance of Work by the New Contractor.

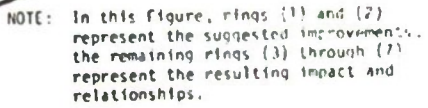
As pointed out in the findings of this study, a contractor's ability to successfully reproduce the hardware often depends upon his ability to cope and flex with procurement, fabrication, assembly, test and inspection problems throughout the entire contract performance period. Much of the planning, preparation, and revisions to plans take place very soon after award. But all reconciliation of technical details are not limited

to that time frame. First article inspection is a major revision point, as is "first month" scheduled delivery; furthermore, at each "bottleneck" point, dilemma, or milestone event up to and including final delivery, revisions to the technical data may be necessary to make it compatible with the objectives of the procurement. Under the present procedures, each such revision may well require an unplanned and undesirable modification to the contract because it must be assessed as to cost and time impact. Under the PPE concept, within the existing scope of work, the contractor routinely questions any details, makes his "compatibility" revisions accordingly, and the Government has an opportunity to routinely reply and to challenge revisions if it disagrees.

Potential Benefits

The above approaches toward solution have addressed the relationships illustrated within concentric rings 1, 2, and 3 of Figure 13. The discussion below addresses the more far reaching relationships indicated by concentric rings 4, 5, 6, and 7.

A rearrangement of management attitudes and operational procedures as suggested by the QUE triad (TOR, SSR, and PPE) should have a widespread positive influence. If the contracting officer were to operate under the QUE triad of procedures and provide an opportunity for questioning and reply among the participants of a competitive reprocurement, it should substantially decrease the frequency and severity of confrontations between the Government Contracting Officer and the newly selected contractor.



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Regardless of which party might first confront the other over his performance, the net effect of the confrontations should be reduced.

1. Reduced Confrontations Over the Government's Performance. (Bottom Half of Figure 13).

a. The quality of the TDP should be enhanced overall as to adequacy, accuracy, currency, completeness, and clarity since it would be routinely challenged in each of these areas.

b. The TDP should be better assessed and understood so that counteracting procurement measures could be taken to offset known shortcomings.

c. The posture of the Government to successfully perform its role during contract execution and administration should be enhanced overall since each salient function would be routinely challenged and reviewed.

d. Possibly most significant, however, is another benefit that would evolve. That is, design disclosure TDP's should almost automatically stratify into four categories and simultaneously improve the definition of the objectives for each type:

(1) Those TDP's which do not qualify for competitive reprocurement. The objective of this category would be to produce as before.

(2) Those TDP's which do not qualify as an "essentially sound" production baseline but are "adequate" enough to be procured competitively providing: a performance specification clearly controls the procurement; the solicitation and resulting contract pricing arrangement

distinctly reflects all development work that may be necessary; and the contract does not imply that the detailed drawings constitute a firm specification which if followed, will result in a satisfactory product. The objective of this category would be to develop and produce.

(3) Those TDP's that are not yet proven to be competitively reproducible but which do qualify as an "essentially sound" production baseline and therefore are subject to use of the PPE Concept. The objective of this category would be to clarify and produce.

(4) Those TDP's that are both "essentially sound" and have been competitively proven or are of such low complexity as to be obviously reproducible by any reasonably competent source. The objective of this category would be simply to produce.

With such an improved definition of the commodity oriented objectives, improved receipt and acceptance of those objectives by the PCO, and more fully effective procedures to accomplish the objectives, the probability of attaining the objectives should be much greater.

And that is the whole idea. The PCO should perform his role in such a way as to accomplish the commodity oriented procurement objectives; it is the state of affairs that should exist in the theoretical "system" of today. The QUE triad of procedures should help "balance up" that which, today, is not fully effective within the system.

It should then be realistic to expect few if any unplanned and undesirable contract modifications over the Government's performance. It

should then be possible to realistically predict the outcome of a given reprocurement action and therefore to measure the feasibility of risking competition in the first place.

2. Reduced Confrontations Over the Contractor's Performance (Top Half of Figure 13).

If a contractor, selected under the QUE triad of procedures, become "unable" to perform his contract after award, it is likely that his reduced profit or loss would be in direct proportion to his inability. The reason for this likelihood is that he would be precluded from profitably misinterpreting the technical data package. He could recoup neither price nor time by "locating" defects. Most clarifications and corrections would merely be classified as "compatibility" changes or otherwise within the scope of work. For this reason he would be motivated to manage his affairs and earn his profit. This would be true with any of the categories of TDP's: those that are "essentially sound" and subject to use of PPE; those that are not "essentially sound" and therefore are procured to a performance specification with the drawings disclaimed pending further development work; and those which are already competitively proven. In addition, contractors would learn to expect an improved performance by the Government during contract administration, ergo fewer confrontations and resulting contract modifications.

It follows that both types of contractors--those who would, if possible, demand price and time adjustments for each defect and those who would not--should be strongly motivated to clarify details of the technical data package in three phases:

- a. Estimating/Bid Phase, to assure themselves of their "ability" to produce prior to submitting a proposal, by carefully examining the TDP for minor and major defects that may be apparent under reasonable review;
- b. Preproduction Phase, to reassure themselves immediately upon receipt of award, by carefully re-examining the TDP;
- c. Production Phase, to continually reassure themselves throughout the span of the performance period, by continuing to carefully examine the TDP.

Therefore, in addition to having the normally required management and technical ability, a contractor selected under the QUE triad of procedures would also have the required special capability, the inducement to control the performance of his subcontractors, and the motivation to cooperatively clarify and resolve details in order to produce as quickly and efficiently as possible to meet the time schedule at the agreed upon price.

And that is the whole idea. It is the way things should be in the theoretical "system" that exists today. The contractor should perform his role in such a way as to accomplish the procurement objectives. The QUE triad of procedures should help "balance up" that which, today, is not fully effective within the "system." It should significantly reduce the frequency and severity of unplanned and undesirable contract modifications over contractors performance. It should upgrade the quality of attained additional/alternate sources of supply. It should instill realism and validity to the source selection criteria. It should make it probable that once achieved, competitive savings would be retained.

While not a panacea, the QUE triad of procedures should have a salutary effect on the whole process or:

1. Government execution and administration of MDE contracts.
2. Industrial competition for awards and performance of MDE contracts.

It should significantly increase the competitive potential of Military Design Equipment.

CHAPTER VIII

CONCLUSIONS AND RECOMMENDATIONS

Introductory Discussion

The reader should not infer that the conclusions and recommendations are for major reforms with sweeping condemnations of existing methods, attitudes, and abilities. Instead, the converse is the case because many practitioners are already aware of the problem in first competitive buys, and their thinking is already attuned to finding solutions. The precautionary devices and techniques discussed in Chapter IV provide evidence of the constructive general attitude that prevails. These recommendations emanate solely from the findings and analyses of this study which includes observations of the PPE concept in use, the effective use of Special Standards of Responsibility, and variations of the TOR idea. The PPE concept has already been largely developed as to detail, procedure and applicability in AMCP 715-6. The technique of using special standards of responsibility is already formalized in ASPR 1-903. The technical objectivity review, as a function, is already being performed to some extent and in some form at various agencies in AMC.

Therefore, the conclusions of this study are new only to the extent that they recognize the unique potentials offered by combining and proceduralizing the set of ideas to accomplish more meaningful and objective-oriented access to technical information. Only a broad approach has been identified in this study. It is an approach that seems to be generally needed to fundamentally improve the transmission process

throughout the spectrum of MDE procurements in AMC; but the recommendations should involve only relatively minor revisions or rearrangements of existing policy and procedures. It is possible that any appropriate implementation could be accomplished at an early date and with only minor readjustments and cost.

Conclusions

1. The success of competitive reprocurements of Military Design Equipment is significantly influenced by the manner in which the procurement technical requirements are transmitted to the competitive market place. When a major subordinate command desires to competitively reprocure an item or part of MDE for the first time, a deciding factor is often whether the technical requirements are transmittable to a competitive market place with reasonable assurance of success. The "adequacy" of the TDP is certainly a most important consideration; but the manner in which the contracting officer transmits it is of equal importance. The TDP may be entirely adequate for competitive reprocurement if the contracting officer uses it appropriately. Conversely, the TDP may be inadequate if the contracting officer uses it inappropriately. Therefore competitive reprocurements of MDE utilizing unproven technical data packages should be recognized by contracting officers as potential problem procurements. They should be processed accordingly, with extraordinary management attitudes and operational procedures.

2. To successfully accomplish objectives, individual specialists need an opportunity for clarification of the TDP. Frequently a design disclosure technical data package is too complex and unique to be transmitted without

a formal opportunity for a question and reply exchange. Furthermore, all specialists are not equally expert and some individuals need an opportunity for exchange more than others. If the individual participants of a competitive reprocurement of military design equipment do not understand the relative quality of a TDP or how to appropriately use it to accomplish the objectives of the procurement within the prevailing environment, they will need to question the transmitter of the TDP to the extent necessary to achieve clarification. This need for questioning and reply (as identified in Chapter VI) may be between the technical and purchasing disciplines in the in-house delegation of the procurement work directive with its associated TDP; it may also be between the contractor and the contracting officer in the contractual delegation of work.

3. Under present day conditions the TDP clarification process results in unplanned and undesirable contract modifications. As the human need for clarification arises, one of two possible conditions will also occur:

a. If the individual does not clarify his doubts or for some reason is precluded from doing so, by the "system" or the procedures or for whatever reason, he will often utilize the TDP inappropriately; this inappropriate use will often have an adverse downstream impact.

b. If the individual does request clarification and resolution of misunderstandings or questionable details, he will likely use the TDP appropriately; under the current procedures, however, such requests will often require adjustments to the time and cost parameters of the agreements.

Therefore, either the TDP will often be utilized inappropriately with adverse downstream effects, or some unplanned and undesirable contract modifications will be nearly inevitable to accommodate the human need for clarification of complex details and objectives.

The results of such misuse and contract modifications will usually be quite adverse (as identified in Chapter V); they will jeopardize funding, scheduling and other mission objectives, the economies achievable through competition, the quality of the additional sources of supply, the integrity and validity of the basis for source selection within the competitive system, and the feasibility of risking the competitive mode of procurement.

4. A "proceduralized" avenue of communication should be and can be devised to permit clarification of the TDP. Alternatives should be created to avoid and minimize the adverse consequences. Procedures should be revised in such a way as to provide a tangible and effective opportunity for technical clarification among both Government and industry participants without direct incremental impact on the cost and time parameters of the agreements. The definitized procedures should be based upon the premise that the need for clarification of the technical data can be anticipated by the individuals involved, both the transmitter and the recipient, and any estimated additional requirements for cost and time can be taken into account when initially establishing the parameters of the agreements. Subsequently such matters of clarification would be included within the scope of work of each party and simultaneously excluded from the purview of the Changes Clause; reasonable, predetermined

types of adjustments to the technical details would not be construed as requiring an addition to or revision of the original agreement.

5. "Proceduralized" clarification permits concentration on objectives. By establishing such communication procedures, it would be possible to conduct business in terms of the objectives of the procurement; and each party would be held responsible for achieving the objectives in spite of the fact that every detail may not be reconciled at the time of delegation.

At present, because of the misunderstood details, a realistic acceptance of the important objectives of the procurement often does not take place at the time of delegation. The agreements tend to be made in view of the almost certain knowledge that some clarification and resolution of the details will be necessary; the knowledge is almost equally certain that the terms of the agreements will therefore change. Yet the important objectives remain the same. Only after complete resolution of each detail does the agreement tend to correspond with the objectives. To use an old cliché, the tail tends to wag the dog.

6. Both the PCO and the contractor should perform their roles in such a way as to accomplish the technical objectives of the procurement. They should do business primarily in terms of technical objectives rather than technical details. Therefore, prior to formulating agreements both parties should initially and clearly identify the primary and important secondary objectives by deliberately pursuing and clarifying the technical details to the extent necessary. It would then seem proper to insist that the initial agreement correspond with the objectives and reflect an

actual intent of the parties to successfully accomplish the objectives that have been identified, in spite of any additional clarifications and resolutions that may be necessary.

7. The technical objectives are easily misunderstood and should be clearly defined. It might be asserted that contracting officers do accept the objectives of the procurement under the present scheme of things; and that contractors also do accept the objectives when they sign a contract. This assertion is probably true in spirit but often not in literal and specific terms for the reasons discussed above. When the specific objectives are obviously not understood at the time of the agreement, it is equally obvious that they could not have been accepted. The observations of this study (as listed in Chapter III) indicate that a major reason for unplanned and undesirable contract modifications is to clarify and reconcile specific objectives that were not understood nor realistically accepted at the time of award.

a. Why do PCO's specify and the contractor's accept a production schedule that is unrealistic for even the most qualified potential producers?

b. Why do PCO's solicit and award contracts under an "open market" environment while many applicable drawings are being revised?

c. Why are awards made in critical procurements where special expertise and facilities are essential when they are not available to the contractors?

d. Why do PCO's and the contractors agree to a FFP production contract when considerable development work remains to be done?

The list of examples could go on. The conclusion, herein, is that the PCO and/or the contractor often do not understand such aspects as the technical constraints, the status of the technical documentation, the special abilities required and the differing types of efforts involved. They often do not understand the specific objectives of the procurement. Therefore they cannot realistically accept the objectives nor be realistically responsible for their achievement.

8. In the sense that both the PCO and the contractor contribute to the large problem, they should assume a share of the responsibility for resolving it. In particular, they should assume a share of the responsibility for the adequacy of the drawings and specifications. A fundamental part of this general concept is that the efficiency of the contracting officer and the profits of the contractor should be directly measurable by their success in attaining procurement objectives. In this way the profit motive is harnessed in both cases, and each party would be accountable for his responsibilities in spite of the fact that a certain level of imperfection and misunderstanding will occur in even the highest quality TDP. The variable range of uncertainty between the concept of an "essentially sound" and "perfect" TDP should not conveniently serve as an escape hatch for shrugging responsibilities, as it often appears to be during contract execution, contract administration, submission of bids/proposals and during contract performance.

9. "Proceduralized" clarification should enhance definition and understanding of both primary and secondary technical objectives. The function of clarifying the detailed aspects of the TDP should take on major rather than minor significance to each party.

Both the contracting officer and the contractor should be hesitant to accept the objectives and to assume the attendant responsibility without assuring themselves as to the adequacy of the TDP. They should immediately desire to minimize implicit communication and maximize explicit communication.

Initially, it would be essential for each participant to estimate the degree and type of clarification and resolution of details that may be necessary, and to estimate the corresponding cost and time impact. This determination should stratify and categorize TDP's, and their corollary solicitations and contracts, in terms of intended use and primary objectives of the procurement: (1) "produce as before"--as dictated in non-competitive TDP's; (2) "develop and produce"--as dictated by TDP's that do not constitute an essentially sound production baseline but are adequate for competitive reprourement; (3) "clarify and produce"--as dictated by unproven TDP's that nevertheless do constitute essentially sound production baselines as determined by previous inspections and tests; (4) "produce"--as dictated by proven TDP's that are essentially sound or will obviously permit reproduction of the item or part by any reasonably competent supplier.

Once the intended use and major objectives were identified, the emphasis on clarification would require a careful assessment of the secondary objectives of the work delegation by both the contracting officer and the contractor. These secondary objectives would be assessed in terms of the constraints of the technical requirements: (1) design; (2) production; (3) procurement; and, (4) verification.

The emphasis on clarification would also require objective-oriented performance of work by both parties. Still further, it would require cooperative attitudes and actions toward reconciling minor misunderstandings and resolving questionable details that may be incompatible with the objectives of the procurement.

10. A technical objectivity review (TOR) should be established. An emphasis on clarification of the TDP presumes that both parties would have the willingness and capability to perform successfully prior to accepting the objectives of the procurement. To provide the contracting officer with such a capability, a Technical Objectivity Review Office should be established (as identified in Chapter VII) to conduct a pre-procurement evaluation of the relevant technical data packages to facilitate meaningful receipt of the TDP objectives. In this function the TOR would serve as a check and balance on the previous organization that transmitted the TDP to the PCO. This function may require or involve a structured information access procedure and format which for purposes of conceptualization, might be labeled a "QUE Sheet." Such a "QUE Sheet" would contain information pertinent to the Quality, Use, and Environment of the TDP and should probably be initiated as early as practicable in

the procurement planning process. Additional documentation should evolve until the QUE Sheet becomes a meaningful record. After transmittal to the PCO, the TOR should then conduct a post receipt evaluation of the TDP in conjunction with and in the vernacular of operational specialists responsible for executing solicitations and resulting contracts. The TOR should in this effort, serve as technical counsel and perform a third party technical review of the major recommendations of the specialists. Still further the TOR should conduct a post-award evaluation of the TDP in conjunction with and in the vernacular of the operating specialists responsible for PCO/ACO interchange and mutual involvement in contract administration. Again his purpose would be to serve as technical counsel and to provide a third party review of the major recommendations of the specialists--whether they emanate from the PCO or the ACO team.

11. Special Standards of Responsibility (SSR) should be emphasized.
To assure the capability of a prospective new contractor, special standards of responsibility should be delineated as a rule rather than as an exception in order to proceduralize discrete investigation and consideration of this important factor. It would provide a meaningful basis for discerning and measuring requirements for special abilities in potential contractors. Such a technique would also provide a medium for specific questioning and reply among the PCO's technical team, the DCAS Pre-Award Survey Team and the prospective contractor.

12. The preproduction evaluation (PPE) concept should be emphasized.
To assure the willingness or motivation of the prospective contractor, it is concluded that a solicitation and contract structuring procedure

technique as generally embodied in the PPE concept (and identified in Chapter VII) should be utilized as widely as practicable whenever the major objective of the procurement is to "clarify and produce." This is typically the objective in first competitive buys utilizing an essentially sound but unproven TDP. Such a technique by definition would also provide a medium for specific clarification between the contractor and the Government, during both the preproduction and the production phases of the contract.

13. The overall concept described above eventually should permit technical clarification without unplanned and undesirable contract modifications; it should permit a more fully effective transmission of procurement technical requirements.

Recommendations

1. Establish widespread recognition of the "QUE" Concept, i.e., the need for clarification of the TDP in order to accomplish objectives.
2. Establish a Technical Objectivity Review as an organizational entity under the PCO to facilitate the function of clarifying the TDP during contract execution and administration.
3. Increase emphasis on the use of Special Standards of Responsibility to facilitate the function of clarifying the TDP during the contractor selection process.
4. Increase emphasis on the use of the PPE concept as a solicitation and contract structuring technique to facilitate the function, within industry, of clarifying the TDP during the estimating/bid phase, the preproduction phase, and the production phase.

APPENDIX

LIST OF CONTRACTS AND CONFRONTATIONS

The following is a list of confrontations taken from the data sheets of 103 contracts studied (three of which have subsequently been removed from the study).

<u>Contract - Confrontation No.</u>	<u>Description of Confrontation</u>
1-1	Delayed first article approval
1-2	Drawings missing; changes incorporated from previous contract
1-3	SAIE unsuitable
2-1	Changes incorporated from previous contract
2-2	N-KR unable to make item on time
3-1	Changes incorporated from previous contract
3-2	SAIE unsuitable
3-3	Common subcontractor conflict
4-1	Changes incorporated from previous contract
4-2	SAIE unsuitable
4-3	Common subcontractor conflict
5-1	Defects in TDP
6-1	GFE late
6-2	Minor defects in TDP
6-3	Contractor unable to make item; financial
7-1	Defects in TDP
7-2	Contractor unable to make item on time
7-3	Debate over acceptable equipment
8-1	GFE debate
8-2	TDP debate
8-3	Contractor unable to make item
9-1	Defects in TDP
9-2	Contractor cannot make item on time
10-1	QA documents illegible
10-2	Defective drawings and SQAPS
10-3	Missing SQAPS
10-4	Contractor started late
10-5	Waivers requested and approved
10-6	EO to increase reliability
10-7	Contractor could not meet rate
10-8	Essential tooling unavailable
10-9	SAIE unavailable
10-10	SAIE unsuitable

Contract-
Confrontation No.

Description of Confrontation

11-1	SAIE unavailable
11-2	Contractor could not meet rate
11-3	Debate over QA or vendor parts
11-4	SAIE unsuitable
12-1	Minor defects in TDP; compatibility changes
12-2	Contractor could not make item
13-1	No confrontation
14-1	Unable to get vendor
14-2	Compatibility ECP
14-3	Key man delay
15-1	No confrontation
16-1	No confrontation
17-1	No confrontation
18-1	Vendor late
19-1	Unsuitable and late GFP
20-1	Bad tooling from vendor
21-1	Contractor cannot meet rate
21-2	Contractor had to remake item
21-3	Bad vendor
22-1	No confrontation
23-1	No confrontation
24-1	Machine breakdown
25-1	Truck strike
25-2	Vendor untimely
26-1	Inaccuracies in drawings
26-2	Design defect in TDP
26-3	Contractor could not make item
27-1	Design defect in TDP
27-2	Contractor could not meet schedule
27-3	Lack of tooling
28-1	Lack of skilled people
28-2	Tool failure
28-3	Vendor delay
29-1	Technical ability: "know-how"
29-2	Requested technical assistance
29-3	Requested machine tool in DP-KR plant
29-4	Untimely and unsuitable gages
30-1	Can't locate suitable subcontractor
31-1	Can't locate suitable subcontractor
31-2	Conflict with DP-KR as subcontractor
31-3	Poor planning and control
32-1	Financial difficulty
33-1	Financial difficulty
34-1	Truck strike
34-2	Unsuitable GFE: test fixture
34-3	Unsuitable GFE: gages

Contract-
Confrontation No.

Description of Confrontation

35-1	Unsuitable GFE: AIE
35-2	Inspection delay
35-3	Failure to specify GFE conditions
35-4	Know-how: heat treating
35-5	Can't meet rate
36-1	Truck strike
36-2	TDP incomplete: standard drawings missing
37-1	Failure to specify interface
37-2	Failure to specify packaging
38-1	TDP not updated: parts obsolete
38-2	Vendor delay
38-3	Equipment breakdown
38-4	Plant shut down: vacation
39-1	Know-how: can't weld
40-1	No confrontation
41-1	No confrontation
42-1	Alleged MIB after award
43-1	Know-how: can't gymnasticate spring
44-1	No confrontation
45-1	Non-compatibility change
46-1	Unsuitable GFE specifications
46-2	Technical ability: material deviations
47-1	Technical ability: tool wear, and inspection
48-1	Incorrect test specification
48-2	Requested expediting test ECP
49-1	Lack of know-how
50-1	No confrontation
51-1	Lack of production know-how
52-1	Lack of know-how
52-2	Truck strike
53-1	Poor tolerance control
54-1	Errors in drawings
54-2	Missing dimension
54-3	Motivation: produced hardware without asking
55-1	Defects, drawings, QA, and test
55-1	Non-compatibility ECP (ambiguity)
56-2	Misinterpretation of ambiguous specification
56-3	Illegible drawing
57-1	Unclear drawing content (unresolved)
57-2	Can't make first article
58-1	Fire in plant damaged equipment
58-2	Financial trouble due to fire
59-1	Essential expertise missing
59-2	Lack of working capital
59-3	Requested reinstatement after termination
60-1	Vendor delay
61-1	Tooling rework
62-1	Rework of item

Contract-
Confrontation No.

Description of Confrontation

63-1	Vendor delay
64-1	Keymen quit
65-1	Compatibility changes to FDP
65-2	Vendor delay
66-1	Financial difficulty
67-1	Management ability: overall
68-1	Management ability: Chapter XI
69-1	Delay on QES approval
69-2	Rework of item
70-1	Non-compatibility change: design
70-2	Non-compatibility: QA
70-3	Compatibility changes to TDP
71-1	Underestimated manhours
71-2	Underestimated manhours
71-3	Conflict over QES approval
72-1	Can't make QES
73-1	Truck strike
74-1	Rate inability
74-2	Contractor can't find vendor
74-3	Vendor delay
75-1	Lack of working capital
76-1	Contractor needed model
76-2	One drawing missing
77-1	Contractor needed more visual aids
77-2	4 sets of ECP's: compatibility and correction of defects
78-1	5 sets of ECP's: corrections, product improvement
78-2	Unsuitable GFE, also untimely
79-1	QAR debate
80-1	No confrontation
81-1	Unsuitable GFP
81-2	Missing drawings
81-3	Government did not respond in timely manner
81-4	Changes to 268 drawings: compatibility and defects
81-5	6 sets of ECP's: compatibility and improvements
81-6	Government unable to provide GFP
81-7	Subcontractor failed to perform on provisioning
82-1	Changes to 140 drawings: compatibility and defects
82-2	3 sets of ECP's: compatibility and improvements
83-1	Untimely and unsuitable GFE
83-2	16 ECP's; first set: defects

Contract -
Confrontation No.

Description of Confrontation

83-3	5 sets of ECP's: compatibility and improvement
83-4	TDP bid upon not the same received after award
83-5	Bad management/questionable motivation
84-1	1 set of ECP's: improvements and compatibility
85-1	32 sets of ECP's: defects, compatibility, and improvements
86-1	No confrontations
87-1	5 sets of ECP's: design, compatibility and corrections
87-2	Government delay in resolving TDP changes
87-3	Can't meet rate and schedule
87-4	Can't meet rate and schedule
88-1	Illegible drawings
88-2	Government delayed resolution of illegibility
88-3	8 sets of drawing designs (PPE, no cost)
89-1	R&D contract instead of production
89-2	Inoperable model
89-3	Debate over intent of contract
90-1	No confrontation
91-1	No confrontation
92-1	No confrontation
93-1	1 ECP: 350 revised drawings: post award update
93-2	Contractor can't meet first article
93-3	Contractor alleges Government delay and failure to resolve
94-1	3 sets of ECP's: improvements
95-1	1 set of ECP's
95-2	N-KR cannot meet rate: late on first article
95-1	26 sets of ECP's: improvement and other type changes
97-1	3 sets of ECP's: every kind
98-1	Model inoperable
98-2	3 sets of ECP's: defects and performance
99-1	Essential tooling availability
99-2	Essential tooling availability
99-3	GFE late
99-4	2 sets of ECP's: defects and compatibility
99-5	Government delay in response and approval
99-6	Update after award
100-1	Confrontation over development nature
100-2	Model inoperable
100-3	6 sets of ECP's: defects, compatibility, etc.
100-4	Contractor claim for damages
101-1	6 sets of ECP's: all kinds
101-2	Drawings conflict with model

Contract -
Confrontation No.

Description of Confrontation

102-1	Contractor unable to meet rate, first article
102-2	ECP: improvement
102-3	Government gave bad packaging data
102-4	Financial difficulty
103-1	Vendor callouts conflict with model; not updated
103-2	ECP's: defects, compatibility
103-3	Government delay in approving ECP
103-4	Rate inability

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